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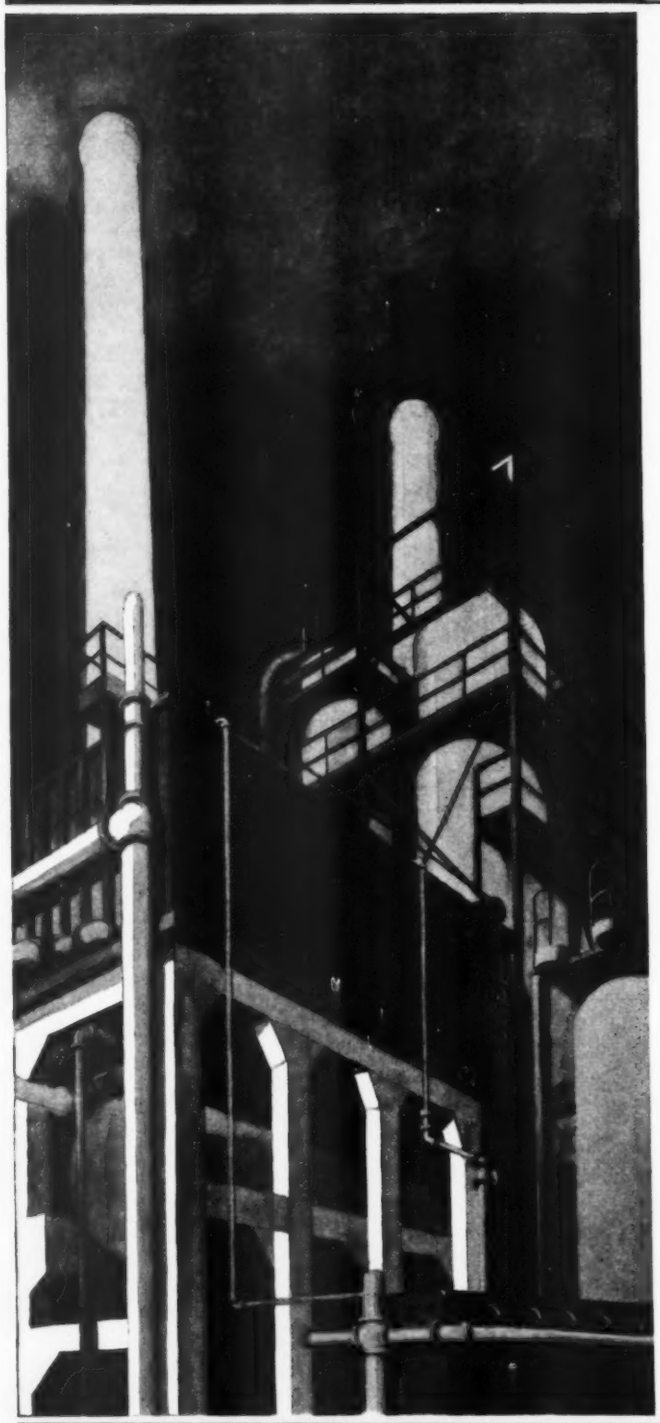
THERMAL



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Advance in Pennsylvania Grade Crudes

PENNSYLVANIA Grade crude stole the spotlight usually centered on the Mid-Continent or some other major producing area, the first of the week with a general price advance. The increases in posted schedules were 12 cents in the Bradford-Allegany area and 15 cents in the remaining Pennsylvania, West Virginia and Southeastern Ohio fields producing that grade of oil. The new prices range from $2.12 to $2.57 per barrel, the differentials being based on the pipe line transportation costs and refining value.

The increase in prices for the Pennsylvania crude oil which totals approximately 75,000 barrels daily, places the schedules at the highest levels in several years. This crude has always occupied a premium position due to the location of the supply and the large yields of Pennsylvania lubricants obtained in the refining operations. The demand for the finished motor and industrial lubricants obtained from the crude has expanded over the past year. The domestic and export markets for Pennsylvania Grade bright stocks and neutral oils strengthened recently and this development is offered in explanation for the higher crude prices.

While the significance of the higher Pennsylvania prices may be local in cause and effect it has been interpreted as an additional indication pointing to the certainty of higher prices for all the remaining fields in the United States. It is pointed out in this connection that the last advance in Pennsylvania crudes occurred in January following general increases in other areas. In the Mid-Continent and Gulf Coast the feeling becomes more general that higher crude prices are assured early in the new year. There have been no definite developments as to time or amount of advance. The advance of 17 cents announced for Oklahoma, Kansas and the Rocky Mountain area early in December to become effective January 4 will precipitate action by major buyers next week according to some observers.

Production 3,125,613

Decrease 11,727

W. J. Armstrong, state conservation agent for Oklahoma, on Tuesday recommended that the allowable production of the state in January be held to 573,100 barrels per day, or in line with the Bureau of Mines' suggestion. It is understood that the Kansas Corporation Commission will adopt the Bureau's suggested figure of 165,600 barrels per day for that state. Texas proration authorities last week increased the allowable 72,907 barrels above the Bureau's recommendation. The Oklahoma and Kansas Commissions may be influenced by the Texas action.

The most important news from the fields included a new pool in Polk County, Texas; an 11,000-barrel well in the Hiss pool, Barton County, Kansas; and a Wilcox sand extension to the Billings pool, Noble County, Oklahoma.

Daily Average Production for Week

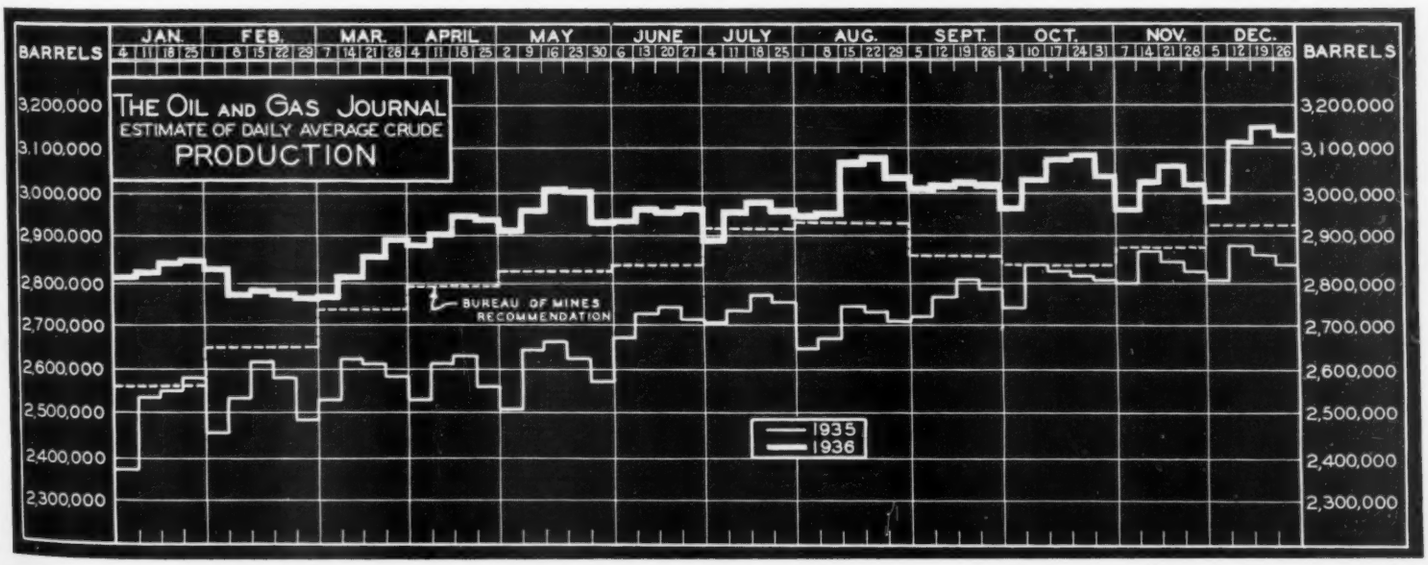
	Dec. 26, 1936	Bur. Mines Dec. est.	Dec. state allowable	Dec. 19, 1936
Oklahoma City	161,325	.....	.....	162,225
Seminole-St. Louis	90,600	.....	.....	93,050
Remainder of State	343,675	.....	.....	342,100
Total Oklahoma	595,600	567,000	595,350	597,375
East Texas	450,911	.....	.....	450,798
West Texas	167,072	.....	.....	176,796
North Central Texas	97,027	.....	.....	87,049
Texas Panhandle	60,460	.....	.....	67,000
East Central Texas	90,245	.....	.....	86,700
Gulf Coast—Texas	261,894	.....	.....	258,298
Southwest Texas	89,240	.....	.....	89,745
Total State of Texas	1,216,849	1,145,200	1,201,470	1,216,386
North Louisiana	80,685	.....	.....	79,400
Gulf Coast—Louisiana	159,650	.....	.....	162,050
Total Louisiana	240,335	204,800	238,350	241,450
Santa Fe Springs	44,400	.....	.....	44,900
Long Beach	64,700	.....	.....	65,450
Kettleman Hills	78,500	.....	.....	78,750
Remainder of State	392,400	.....	.....	405,000
Total California	580,000	553,400	*551,000	594,100
Kansas	176,150	155,900	163,225	173,600
Arkansas	28,010	26,800	.....	27,990
Eastern Fields	115,200	110,600	.....	113,800
Michigan	27,399	29,300	.....	27,519
Southeastern New Mexico	79,380	77,270	85,155	79,730
Rocky Mountain area	66,690	60,030	.....	65,390
Total United States	3,125,613	2,930,300	.....	3,137,340

*Recommendation of Central Committee of California Oil Producers.

Crude Oil Stocks in United States

(BUREAU OF MINES ESTIMATES)

Week ending December 5, 1936	287,587,000
Week ending November 28, 1936	288,630,000
Week ending December 7, 1935	315,349,000



World Oil Is Largest

EXPANDS WORLDWIDE OPERATIONS—*Sir John Cadman, chairman, Anglo-Iranian Oil Co. Ltd.—(Anglo-Iranian Photo)*

World crude oil production in 1936 aggregated 1,799,395,000 bbls., the largest of record and 155,218,000 bbls., or 9.4 per cent, greater than that of 1935, the previous peak.

The average daily output of 4,916,380 bbls. represented an increase of 441,786 bbls. over the average of the previous year, a gain which was more widely divided among the oil-producing countries than in any preceding period. By the end of the year production had increased to slightly more than 5,000,000 bbls., an objective which many world economists have predicted would not be reached until the next decade. If to this is added the natural gasoline from casinghead gas, the daily average output for 1936, based on preliminary estimates, was approximately 5,100,000 bbls.

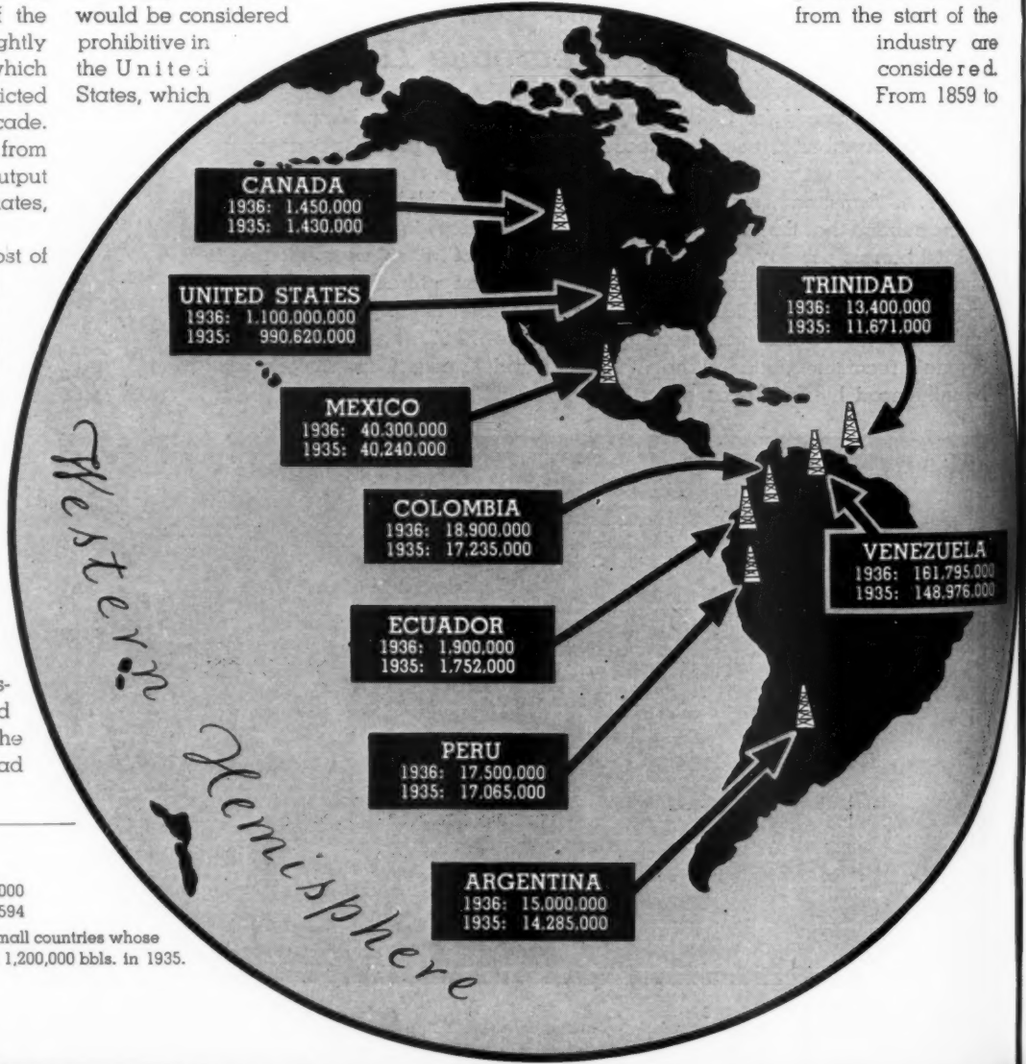
It was a record-breaking year for most of the oil-producing countries, large and small. The six countries which produce 90 per cent of the world's crude each established a new all-time peak, while Iraq, Peru, Bahrein Island, Germany, Japan and several less important countries also brought more crude oil to the surface than during any previous 12-month period.

The record production was obtained without the aid of new flush areas, which in the past have usually been associated with rapid expansion in supplies of petroleum products. Old fields were extended and a number of relatively small oil reserves were discovered, but the bulk of the increased output for 1936 is accounted for by the further development of fields which had been producing one or more years.

Unusual uniformity in the gains for the year was reported by the important oil-producing countries, the increases in most cases ranging from 6 to 10 per cent. These gains reflected a general rise in demand with most countries able to maintain their proportionate share of world markets. This was accomplished in several cases despite governmental restrictions, additions to already heavy taxes, labor difficulties, and the continued trend toward nationalization of the oil industry apparent in several countries.

Consumers practically everywhere bought more petroleum products than ever before. In the case of motor fuels the prices paid in many countries would be considered prohibitive in the United States, which continues to consume approximately 60 per cent of the world's petroleum. These high prices were due to revenue taxes and the regulations made by countries attempting to develop synthetic or substitute products. Increased motor vehicle production in several countries; construction of improved highways in areas where they were practically unknown five years ago; rapid extension of motor power in marine and industrial fields; fuel demands of enlarged navies and introduction of burning oils into sections where they were previously not used, are among the factors that have created a new peak in world demand.

Just what this increasing world demand has meant over the past year and its still greater significance in future years are apparent when data from the start of the industry are considered. From 1859 to

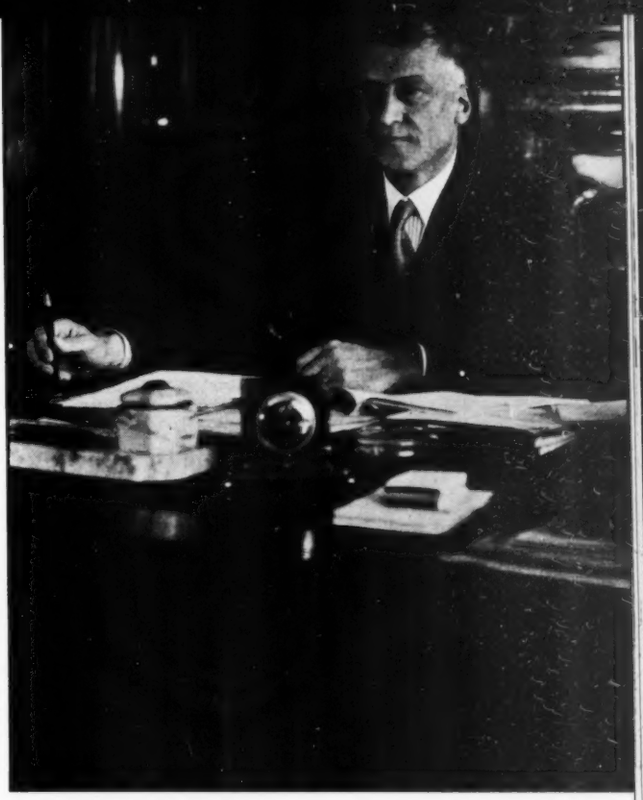


WORLD OIL OUTPUT (BARRELS)

	1936*	1935
	1,799,395,000	1,644,177,000
Daily	4,916,380	4,504,594

*Estimated.—Total includes output of several small countries whose 1936 production is estimated at 1,300,000 bbls. and 1,200,000 bbls. in 1935.

Production on Record



SUCCESSOR TO SIR HENRI DETERDING—*J. E. K. de Kok who took over his new duties as general managing director of the Royal Dutch-Shell group of companies this month*

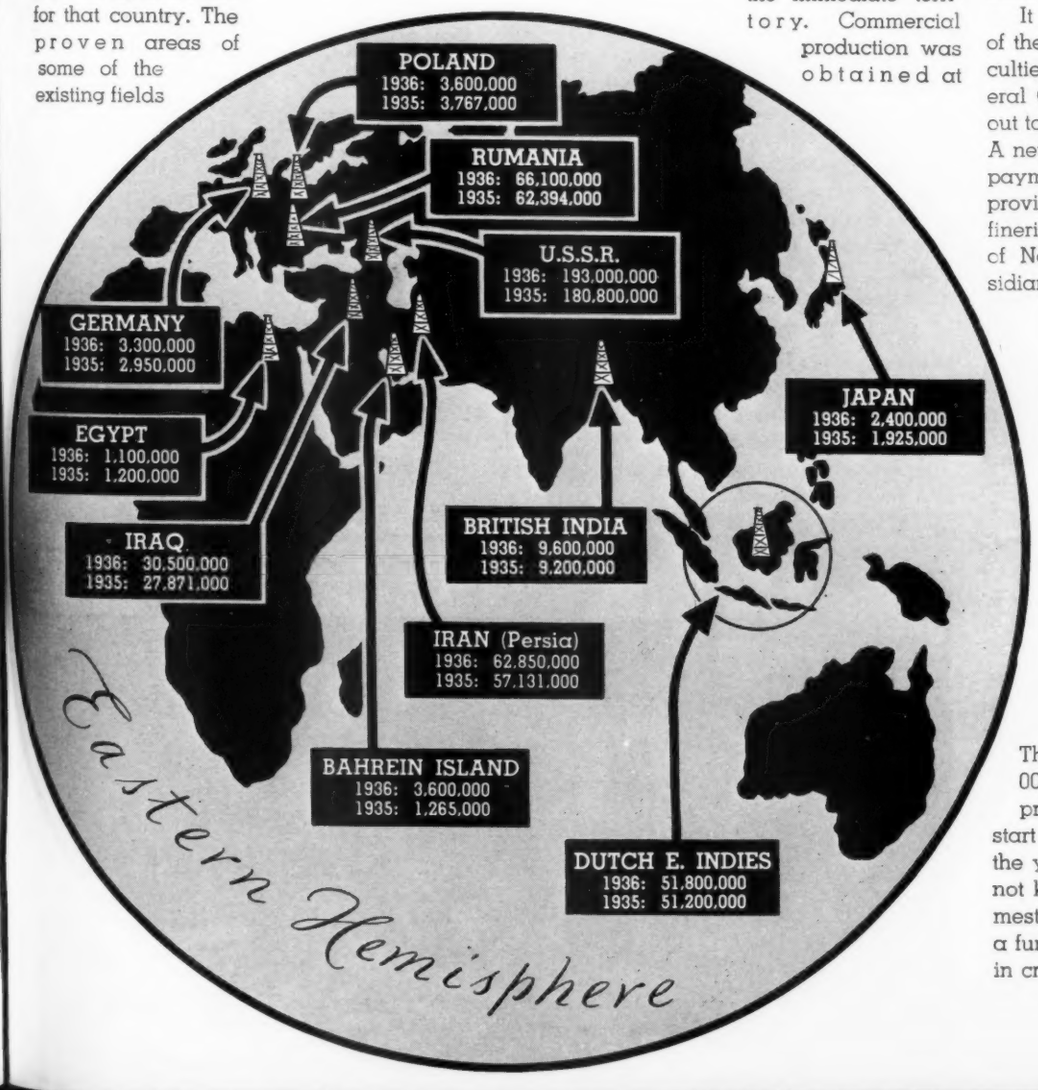
the end of the year now closing approximately 29,136,000,000 bbls. of crude oil have been produced, and with the exception of an estimated three-quarters billion barrels now in storage this output has been consumed. It is pointed out that more than 6 per cent of the total consumption has taken place over the past year. In this connection, considering the substantial reductions in crude stocks in the United States, it is probable that the actual world demand for crude oil slightly exceeded the peak output of the past year.

VENEZUELA

Venezuela's daily average production of 442,063 bbls. was 8.6 per cent greater than that of the previous year and established a new output record for that country. The proven areas of some of the existing fields were extended, but the bulk of the increased production is accounted for by inside drilling and secondary recovery methods. In the Lake Maracaibo district more wells were placed on the pump. The gas-lift and repressuring also were used in increasing the output of wells which had ceased flowing.

Interest in new discoveries in Venezuela centers in the eastern part of the country, where several wildcat tests are drilling, with others scheduled to start next year. At least three of the exploratory tests were reported to have encountered promising formations and others will be drilled in the immediate territory. Commercial production was obtained at Pedernales. The crude is of low gravity, but the fact that field adjoins water transportation assures further development. The production of the Quiriquire field, the only important producing area in eastern Venezuela at this time, was increased.

It was hoped by operators at the close of the year that the political and labor difficulties which started with the death of General Gomez late in 1935 have been ironed out to the satisfaction of everyone concerned. A new petroleum law has increased royalty payments to the government, and another provision will force the construction of refineries in Venezuela. The Standard Oil Co. of New Jersey through an operating subsidiary has completed plans for the construction of a new plant which will involve expenditure of several million dollars. The bulk of Venezuelan crude at present is processed at three refineries on Aruba and Curacoa islands of the Dutch West Indies. These plants are operated by subsidiaries of the Royal Dutch-Shell and Standard of New Jersey, the principal producers in Venezuela.



NEW PEAK IN U.S.S.R.

The oil administration of the Union of Soviet Socialist Republics (Russia) expects further to expand all phases of that country's oil activities in 1937. The record production of more than 525,000 bbls. daily in 1936 was less than the projected output of the government at the start of the year by several per cent, and the yearly gains of the past three years are not keeping pace with the expansion in domestic requirements. Soviet exports showed a further decrease this year despite the gain in crude production and refinery output. The

YEAR-END PROMOTION—*Baron J. C. Panthaleon van Eck, chairman of board of Shell-Union Oil Co. for several years, becomes a managing director of Royal Dutch-Shell group*
Blank & Stoler Photo

number of new refineries was expanded during the year with a 10,000-bbl. plant at Orsk and a 12,000-bbl. plant near Ufa in the Ural Mountains, 1,000 miles northeast of Baku, the center of the Caspian Sea operations of the Soviet. This inland refinery will operate with the new high sulfur crude supply from the Sterlitimak field. The new plant, which started operating this month, was built with cracking facilities to produce high-octane gasolines. Twenty additional cracking units were built at the older refineries. The Soviets are installing solvent refining facilities for the manufacture of lubricating oils and have done some work in the commercial application of polymerization. The 1937 and 1938 plans of the Soviet call for active exploratory work in several areas, some of which are in remote regions.

Italy resumed its program to develop a domestic refining industry, temporarily stopped by the war with Ethiopia. A new refinery at Trieste is near completion and another at Naples is practically being rebuilt. The Shell and Standard of New Jersey, which with the A.G.I.P., the government-controlled company, are the principal refiners in Italy, either have modernization and enlargement programs under way or have work planned for next year. When these programs are completed, Italy will have sufficient refinery capacity to supply practically all of her domestic requirements, which have returned to normal following the large purchases during the Ethiopian campaign. An approved government plan provides for the scientific determination of the oil possibilities of Italian East Africa (Ethiopia) preliminary to actual exploration. It has not been determined whether the government will grant concessions to private operators or develop the oil reserves as a government project.

The government is fostering the refining of synthetic products through hydrogenation of shale and other materials. A new project calls for the construction of a specially designed processing unit of large capacity at Bari to operate with heavy oils produced in Albania.

IRAQ RANKS EIGHTH

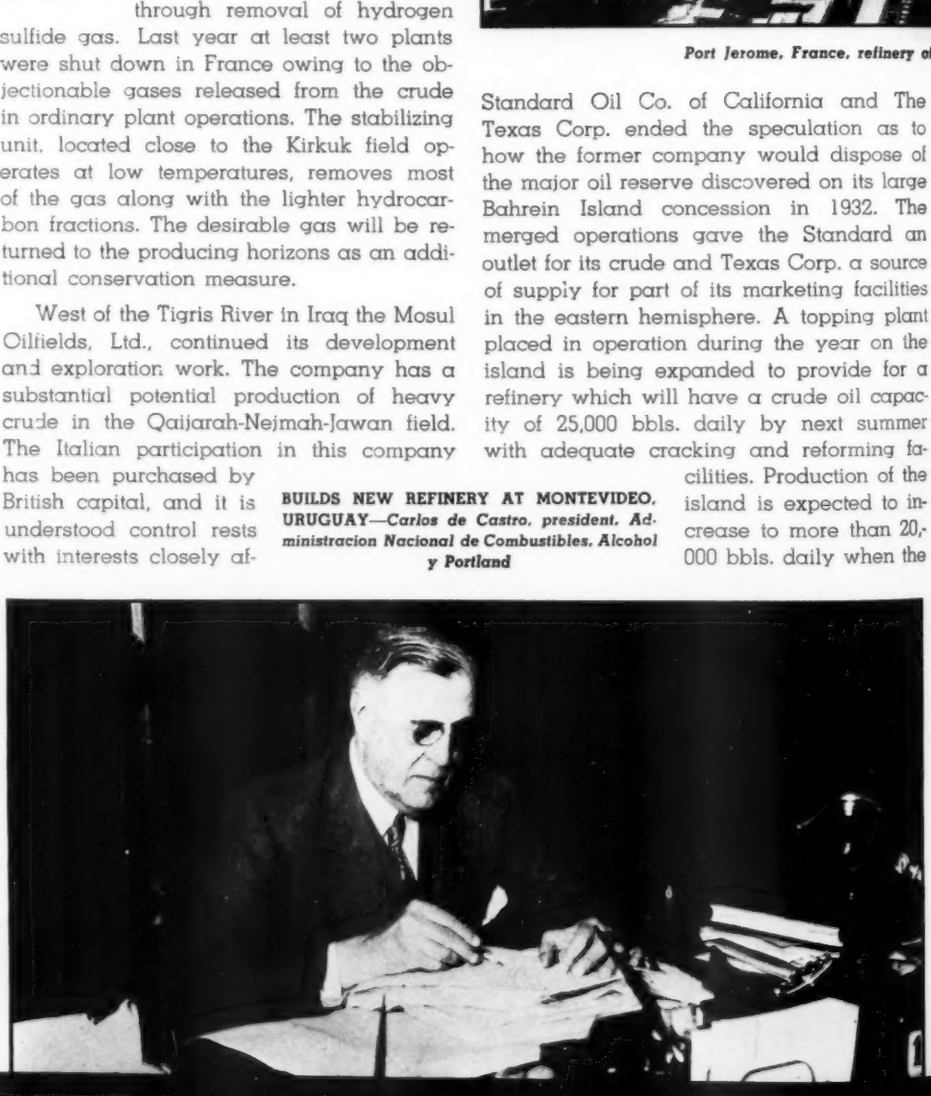
Iraq, of no importance in world markets three years ago, was able to increase the deliveries of the pipe line to Haifa and Tripoli on the Mediterranean, and its output at the close of the year was approximately 85,000 bbls. daily. This production comes from the Kirkuk field, often referred to as the most scientifically developed major producing area of the oil world. Controlled by the Iraq Petroleum Co., Ltd., it has been developed with a minimum of drilling. The most important development of the year was the installation of crude stabilizing unit with a capacity in excess of 100,000 bbls. daily. This unit will make the crude more merchantable through removal of hydrogen sulfide gas. Last year at least two plants were shut down in France owing to the objectionable gases released from the crude in ordinary plant operations. The stabilizing unit, located close to the Kirkuk field operates at low temperatures, removes most of the gas along with the lighter hydrocarbon fractions. The desirable gas will be returned to the producing horizons as an additional conservation measure.

West of the Tigris River in Iraq the Mosul Oilfields, Ltd., continued its development and exploration work. The company has a substantial potential production of heavy crude in the Qaijarah-Nejmah-Jawan field. The Italian participation in this company has been purchased by British capital, and it is understood control rests with interests closely affiliated with the Anglo-Iranian Oil Co., Ltd. Although rumored from time to time, there have been no definite developments in the proposed pipe line to Alexandretta or some other point which would give this area an economical outlet for any crude reserves discovered.

Bahrein Island and the Persian Gulf area generally continued to occupy a prominent place among important oil developments over the past year. A merger of the Persian Gulf and Far East properties of the Standard Oil Co. of California and The Texas Corp. ended the speculation as to how the former company would dispose of the major oil reserve discovered on its large Bahrein Island concession in 1932. The merged operations gave the Standard an outlet for its crude and Texas Corp. a source of supply for part of its marketing facilities in the eastern hemisphere. A topping plant placed in operation during the year on the island is being expanded to provide for a refinery which will have a crude oil capacity of 25,000 bbls. daily by next summer with adequate cracking and reforming facilities. Production of the island is expected to increase to more than 20,000 bbls. daily when the

Port Jerome, France, refinery of Sta[ndard] Amer[ican]

BUILDS NEW REFINERY AT MONTEVIDEO, URUGUAY—*Carlos de Castro, president, Administracion Nacional de Combustibles, Alcohol y Portland*



refinery is completed. Plans are being completed for a tanker distribution of the plant's products to four continents of the eastern hemisphere. A deep test is being drilled on the island.

WILDCAT STRIKE

Probably the most important wildcat strike of the year outside the United States was that of the California Arabian Standard Oil Co. (Standard of California) on the mainland of Suadi Arabia, which is separated by

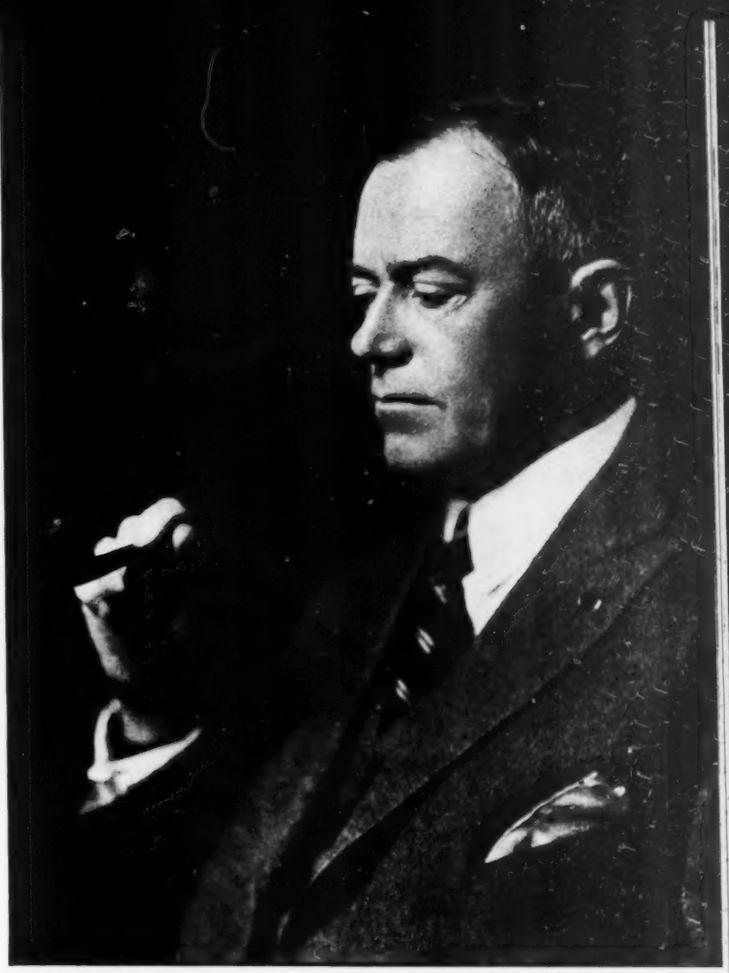
...co Americaine de Raffinage

17 miles of submerged land from Bahrein Island. The company's No. 2 Damman produced at the rate of 3,200 bbls. of high-gravity oil daily from a sand depth of 2,100 feet. Another test has found the same sand in the immediate territory. The full significance of this discovery had not been determined at the end of the year, but it and the successful Bahrein Island development have brought the entire Persian Gulf area to the attention of operators. Four other tests are drilling and 40 miles north the company is testing another structure. Fifty miles farther north in Kowait, the Anglo-Iranian Oil Co., Ltd., and the Gulf Oil Corp. are drilling their first test on a large concession. Additional concessions have been taken in countries bordering on the gulf and more tests will be drilled in 1937, with geological crews continuing work which was responsible for the discoveries of the past year.

Wildcat drilling will continue in England during 1937 in the effort to find commercial production. The two tests being drilled in the south coast region by D'Arcy Exploration Co. so far give no promise of commercial production. Additional territory in England and Scotland has been licensed for exploratory work. A subsidiary of the Standard Oil Co. (New Jersey) ranks next to the Anglo-Iranian Oil Co., Ltd., in point of areas under license.

The trend toward nationalization threatens to end private operation in Argentina. Effective in February through government decree, Yacimientos Petroliferos Fiscales (YPF) will enjoy a monopoly covering distribution of petroleum products in the Buenos Aires area, the most important market of Argentina. Y.P.F. is controlled by the government, and the action is interpreted as the start of a government program of granting special concessions to the company which will make it impossible for private interests to compete.

Indicative of this situation, the Standard of New Jersey has entered into negotiations with the government to dispose of the properties of its subsidiaries operating in that country. These properties, which are valued at several million dollars, include production, refining, pipe lines and marketing facilities. Shell subsidiaries rank first in Argentinian oil operations.



INTERNATIONAL OPERATIONS CONSTANTLY EXPANDING — ***Walter C. Teagle, president, Standard Oil Co. (New Jersey)***
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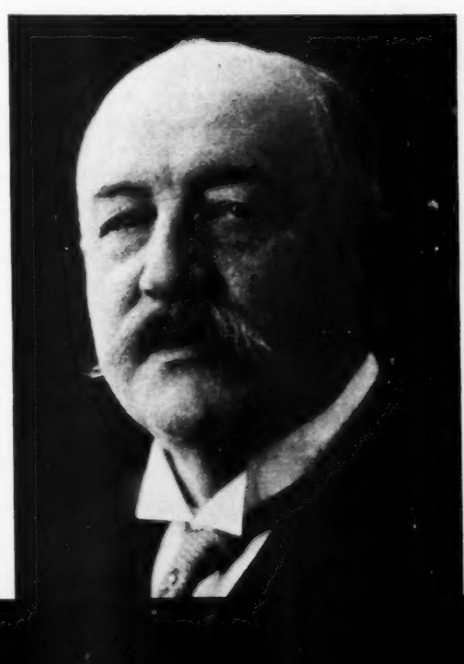
JAPAN EXPANDS

Japan increased its output and progressed in the manufacture of synthetic products. It has a long way to go in making the country independent as to petroleum supplies. The country still imports more than 90 per cent of its domestic requirements in the form of crude oil or refinery products. The government has not carried out all phases of its 1934 program based on national defense, which would have required foreign interests to maintain storage equivalent to six months



SECURES OIL FROM WELLS AND MINES IN FRANCE — ***Fernand Herrenschmidt, president "Pechelbronn" Societe Anonyme D'exploitations Minieres, Strasbourg, France***

requirements. It was announced in October that a five-year extension of an agreement between the U.S.S.R. and the North Saghalien Oil Co. (controlled by Japan) had been closed. This covers the continued development of oil reserves on Sakalin Island off the coast of Siberia. Additional territory will be available for development under the new agreement.

Trinidad expanded its production and refinery operations. It constitutes the most important oil-producing country of the British Empire and finds a ready outlet for its refinery products. Its production at the close of the year was approaching 40,000 bbls. daily.

Germany's production of crude oil showed only a small increase over 1935 despite the fact that the domestic crude supply has a value of approximately $5 per barrel. This country has not yet solved its problem of controlled oil supplies, with the demand constantly increasing. The past year brought an expansion in cracking facilities with emphasis placed on the refining of lubricating oils from domestic crudes.

COMPLETES REFINERY PROGRAM

France's refinery program inaugurated in 1928 with legislation which favors domestic operators was practically completed last year with two new plants, making a total of 14 in operation at this time. France now obtains better than 80 per cent of her petroleum needs from domestic plants.

With crude production in 1936 about the same as in 1935, greater activity is expected in the Dutch East Indies next year. The islands on which production has been dis-

ACTIVE HEADS OF STANDARD OF NEW JERSEY OPERATING UNITS—*E. Holman, president, Creole Petroleum Corp.; G. W. Gordon, officer of subsidiary companies and director of manufacturing operations outside the United States; G. H. Smith, president, Imperial Oil Co., Ltd., and International Petroleum Co., Ltd.*
Blank & Stoller, Inc., Photos

covered, including British Borneo, have undeveloped proven areas, and exploratory work will be continued in other sections.

Rumania increased its production in 1936 despite handicaps which have to do with operating conditions, high transportation costs and competitive conditions in European markets. No new discoveries of major importance were reported. Refining facilities were improved and enlarged at three plants.

Mexico's production was maintained last year notwithstanding labor difficulties involving all of the larger operators. Unusual demands were made by organized labor and several properties were shut down when operators refused to accede to the requests.

The labor situation was critical at the end of the year and it was impossible to predict the trend in 1937 operations. New areas have been discovered over the past two years and promising geological structures have been outlined for exploratory work, but normal development will not be carried on by private interests until labor and political conditions are more encouraging.

Colombia and Peru increased their production with the crude output of Peru the largest in its history. Old fields in the two countries were extended and drilling was more active. In Colombia control of the Colombian Petroleum Co. was purchased by the Texas Corp. and the Socony Vacuum Oil Co., Inc., from the Venezuela Gulf Oil Co. (Gulf Oil Corp.). The new owners will continue exploratory drilling and geological investigations. Production has been developed in several wells in the Petrolea section, but the quantity is not yet sufficient to justify construction of a pipe line outlet to the coast.

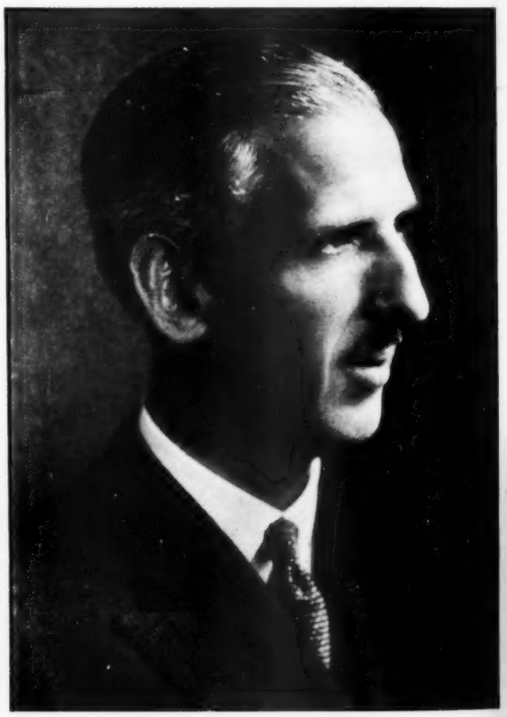
DIRECTS WORLDWIDE OPERATIONS—*J. M. de Booy, newly appointed managing director of the Royal Dutch-Shell group*

EUROPEAN MARKETS

In spite of trade restrictions and difficult economic conditions, the consumption of oil in Europe made a definite advance during 1936.

With few exceptions, the importing countries took larger quantities; the rate of increase was almost everywhere higher than in previous half-years since the beginning of the crisis. Neither the scarcity of exchange nor the growing tendencies in some countries toward self-sufficiency has checked to any marked extent the increasing demand for oil.

Next to the general increase, the most noticeable feature of oil imports in Europe is the larger quantities of crude and semi-finished products purchased. Although the number of countries is small where home refiners are able to satisfy public requirements to any great extent, there has been a very marked increase in the demand for raw material for refining from certain countries, notably France, Germany, Holland and Spain.



OPERATIONS COVER BRITISH EMPIRE—*William Fraser, C.B.E., deputy chairman, Anglo-Iranian Oil Co. Ltd.—(Anglo-Iranian Photo)*

Although import statistics cannot be regarded as an exact index of internal demand, since changes in stock positions and domestic refining of crude are apt to conceal the real trend of consumption, yet they must remain the most reliable indication available of a country's petroleum requirements.

GOVERNMENT GRANTS MARKETING MONOPOLY—*Agustin Rosas, director of Yacimientos Petroliferos Fiscales (Argentina Government Oilfields)*

In the case of Italy, which ranks fourth in Europe in the matter of oil requirements, a difficulty arises from the fact that, after October, 1935, no official trade statistics were published, so that any accurate estimate of internal consumption in that country is not possible. Domestic consumption in Italy was still impeded by war restrictions which continued in force during the first half of 1936, but, as military requirements must have declined since the close of the Abyssinian campaign, it is almost certain that imports were lower this year than last.

In the case of Spain, the civil war has probably been responsible for some decrease in the volume of imports this year.

Subject to these two cases official statistics for 15 European countries give a total of oil imports during the first six months of 1936 of 13,563,200 tons, which is an increase of more than a million tons, or 8 per cent, over the corresponding 1935 period.

As previously mentioned, the greatest increase was shown in crude oil imports, which accounted for almost two-thirds of the total increase and is due to extension of refining activities throughout the European continent as explained later.

Imports of gas oil and fuel oil also rose, while there was a small increase in gasoline purchases.

Although the above summary cannot present a true picture of the course of consumption of individual products, nor can the crude oil be accurately split up into its equivalent refined products in the various countries, yet it is certain that consumption of finished products in Europe has risen considerably in the past year.

This increase is, of course, mainly due to the improving conditions of world trade and steadily, if slowly, expanding world markets; in fact, it is well established that the statistics of oil consumption in any country are a fairly reliable indication of the business conditions in that particular country. This improvement in consumption figures has taken place in spite of a growing tendency on the part of govern-

(Continued on Page 64)

HONOR LONG SERVICE OF ASSOCIATE—*A. L. McColl, chairman of Vacuum Oil Co. Ltd., and J. A. Brown president of Socony-Vacuum Oil Co. Inc., attending banquet in London honoring 35 years of service of Hubert Holliday, managing director of Vacuum Oil Co. Ltd.*

International Features

Detailed information covering developments by countries, including maps and engineering feature articles, starts on page 57.

Foreign language section, including discussion of engineering trends in crude oil production, refining, transportation and natural gasoline practices, starts on page 147.

DIRECTLY INTERESTED IN FAR EAST AND PERSIAN GULF OPERATIONS—*G. S. Walden, chairman of board, Standard Vacuum Oil Co.; T. Rieber, chairman of board, Texas Corp.; K. R. Kingsbury, president, Standard Oil Co. of California*

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Installing rocker-type take-off

Densely Drilled Texas Field Are

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Types of pumping equipment vary widely from the most up-to-date standard rigs to a complete variety of multiple pumping devices, such as small and large central bandwheel powers, geared powers, back side crank take-offs, stroke post arrangements, four-well powers of various designs, and every possible type and mounting of light duty pumping units.

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According to a recent survey, out of the 5,700 pumping installations made to date, 1,280 are standard rigs, 1,288 are pumping units, 1,044 wells are operated by some form of back-side cranking, 2,006 wells are pumped by 274 powers of various types, and 82 wells have undetermined types of units. Standby units consist of 640 standard rigs, 480 units, 290 back-side crank installations, and 940 wells on central powers.

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In anticipating the ultimate requirements for pumping equipment now being installed for future needs, a combination of economic and engineering or geological factors is today serving to determine for each operator the proper type of pumping equipment to install under given conditions. The majority of these factors, of course, bears upon the total estimated fluid to be lifted throughout the service life of the equipment. A brief description of some of the more important considerations which are affecting the selecting of lifting equipment are as follows:

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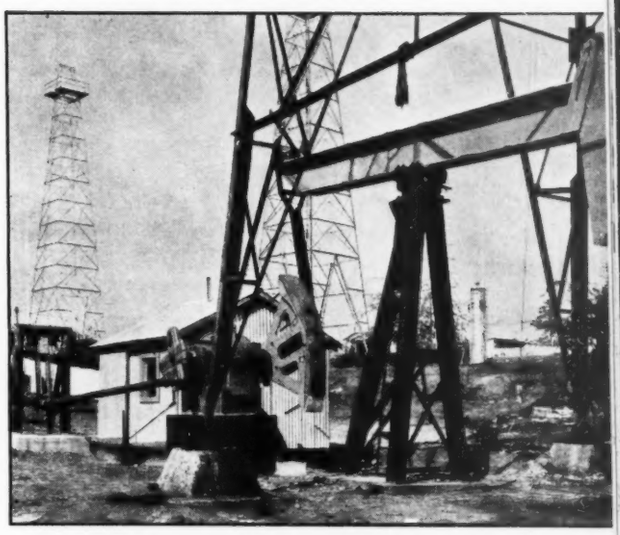

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WELL SPACING

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9. The fact that certain operators have wells throughout all sections of the field have justified them in installing lighter equipment than eventually will be needed in the heavy water volume areas, with the idea in mind of transferring the original units to thinner sand sections where water has not become such a factor. Savings in early investments over a several-year period will more than care for the transfer of equipment.

CONTINUOUS RATE

Every estimate of East Texas' future has contained some prediction as to the rapidity with which wells will be equipped to pump. The rate has not been nearly so rapid as many thought one year ago, and at this time it seems altogether probable the trend during the next 12 months will be methodical, and not greatly exceed the 1936 rate.

In a consideration of this problem, the following factors deserve careful study:

1. There are now 2,350 wells already equipped with standby units which must be absorbed before each well that indicates the need for pumping equipment will mean a new installation. Of course, additional standby units are slowly being made, but they are not keeping pace with the present installations being placed in active service.

2. Of the 21,890 present producers, 16,500 are classified as "marginal wells" which include those having an hourly potential flow less than 860 bbls., and are given the minimum allowable of 20 bbls. per day. Assuming that the 5,700 present installations are all marginal wells, there remain 10,800 wells of this class without pumping equipment. A good portion of this group are allotted an hourly flow today considerably less than 860 bbls., and a small group monthly require initial agitation and eventually pumping to maintain allowed production.

3. The rate of initial water appearance in flowing wells gives a good index of rapidity at which pumping facilities will be needed. From July to October 1 of this year approximately 250 wells began showing water in varying proportions. This is about 83 wells per month and closely conforms to the rate at which wells were placed on the pump during that period.

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Thus it appears as though the orderly development of the East Texas field and the conservation of natural energy is bearing fruit, and the continued application of good engineering principles in producing the existing wells will often delay installation of the pump but the latter's ultimate use is unavoidable.

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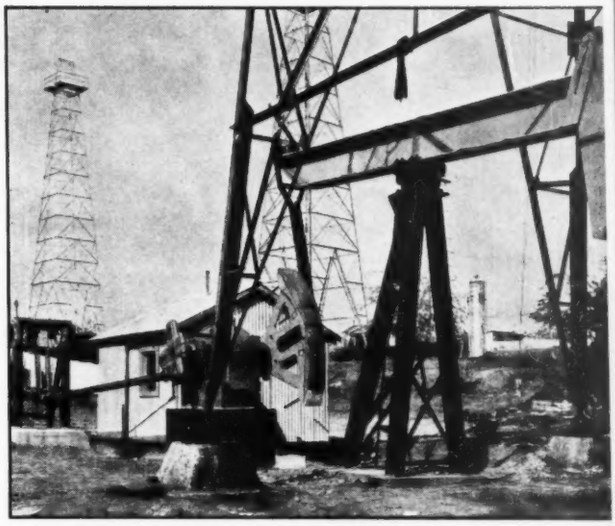

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Government Pressing Its Plans for Madison Trial in March

MADISON, Wis.—Fortified with new indictments against 27 oil companies and 69 of their officers and employes, the government continued preparations last week to push its antitrust law cases to trial in March, while defense attorneys apparently were laying plans to anticipate the move by appeal of one or more court orders.

The new grand jury, impaneled December 15, returned three new indictments December 22, reiterating charges contained in previous true bills voted by another grand jury, the legality of which is under challenge by the defendants.

Government counsel indicated to Judge Patrick T. Stone on the same day they are prepared to proceed with removal hearings in various parts of the country early in January, regardless of the disposition made of the earlier indictments.

Arguments on a plea in abatement, asking dismissal of the original charges, are set for January 1. On the same day Judge Stone ordered hearing on an order to show cause why his earlier action, impounding evidence considered by the old grand jury, should not be set aside. He refused, however, pending the argument, to grant a temporary restraining order to prevent use of the documents before the new grand jury. But he allowed exceptions and they were filed formally by H. H. Thomas, Madison, and W. H. Dougherty, Janesville, Wis., associate counsel for 19 of the indicted corporations. Special written exceptions were submitted, Dougherty explained, because "appellate courts are very technical."

TRACEY CASE

One of the three new indictments was a reindictment of William A. Tracey, Fort Worth, Tex., southwestern bulk sales manager for Sinclair Refining Co., on perjury charges. A previous amended indictment brought against Tracey was dismissed after the old grand jury was discharged early this month. It charged he testified falsely in regard to an alleged cooperative agreement among major oil companies for purchase of "distress gasoline." He was resubpoenaed to appear before the new grand jury, but had failed to do so up to the day when the new indictments were returned, though it is understood he was en route to Madison to testify when notified he would be too late.

The other two indictments are essentially redrafts of the old ones, though changed in some respects to strengthen them.

One, restating the charges brought by the old grand jury on July 28, accuses 24 oil companies, three trade publications and 56 individuals of conspiring to maintain artificial gasoline market prices by means of the alleged "buying pool" and the other charges 23 oil companies and 46 individuals, identical with the defendants named in the November 6 indictment, with combining to restrict jobber margins by means of uniform contracts.

The "buying pool" indictment eliminates the names of three individuals originally named and adds one defendant corporation. R. G. A. van der Woude, New York, president of Shell Union Oil Corp., omitted from this bill, remains as a defendant in the other. The others eliminated are E. W. Sinclair, New York, president of Sinclair Refining Co., and H. E. Koopman, Bartlesville, Okla., vice president of Phillips Petroleum Co. In place of the latter the new grand jury substituted the name of Fred L. Koopman, also of Bartlesville. The twenty-fourth corporation added to the list is Tide Water Oil Co., New York, which is named as a subsidiary of Tide Water Associated Oil Co., the name of which, in turn, was substituted as a slight amendment to the list of defendants in the "restricted margins" case.

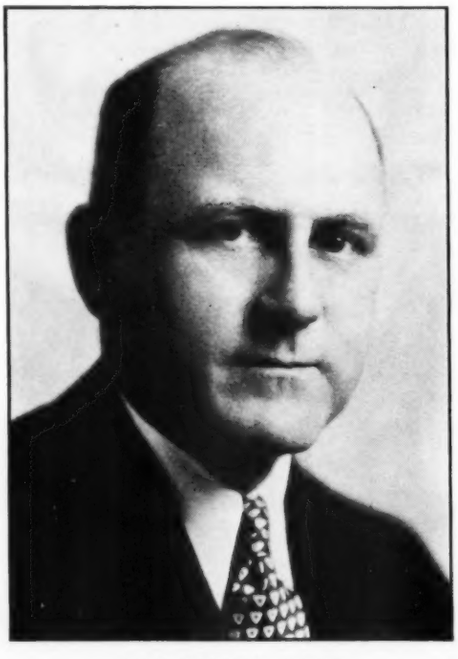
While the subject matter of both new indictments is generally a restatement of the original charges, the "buying pool" bill has been changed to remedy an oversight alleged in defense pleas challenging the court's jurisdiction on ground the indictment failed to allege any offense within its venue. The amended charge specifies that prices of gasoline sold in interstate commerce, including the western district of Wisconsin, were affected by the alleged purchasing conspiracy.

MADISON CASE JUDGE

Following but three years on the federal bench, Judge Patrick T. Stone of the western Wisconsin district faces his biggest assignment in the cases of 27 oil companies and 69 individuals indicted for alleged violations of the antitrust laws.

His brief judicial career, however, has not been lacking in tasks of a major character. Several times he has presided at trials in Chicago. Last May he was called to Detroit to preside for three weeks in the famous "Michigan bank cases." A lesser case, however, won him the widest editorial comment of his career and newspapers in many parts of the United States commended him as a "humane judge." The incident occurred in the Superior, Wis., branch of his district, when Dr. August Costello, of Spooner, Wis., appeared before him on an indictment charging a technical violation of the narcotics act. Preceding the aged physician's arraignment, Judge Stone had been impressed by a flood of letters from citizens of Spooner, picturing the doctor as a public benefactor, who had ministered to the wants of many poor people, without reward, over a long period. The judge refused to let him enter a plea of guilty, and sent him home without the stigma of a court record.

Judge Stone's home is in Wausau, Wis., with his wife and three children. He was 44 years old in 1933, when appointed by President Roosevelt to fill the vacancy left on the district bench by the death of Judge Claude Z. Luse. A graduate of Marquette University, Milwaukee, Wis., he had practiced law in Wausau since 1912, served for eight years as city attorney, and for 12 years was chairman of the Marathon County Democratic committee. He served in the navy during the World War and was active for many years in American Legion work, having been commander of his local post, and at the time of his appointment was judge advocate of the Wisconsin state department.



JUDGE PATRICK T. STONE
United States District Court, Wisconsin

Asks for Federal Ruling on California Tidelands

LOS ANGELES, Calif.—Contending that the federal government owns the mineral rights to tideland oil deposits, Attorney Ben L. Blue has requested Attorney General Cummings to file a suit on behalf of the United States against the state of California to quiet title on proved tideland petroleum properties.

Mr. Blue represents three Los Angeles claimants whose applications to develop tidelands at Huntington Beach, Rincon and Elwood recently were denied by the U. S. land commissioner, because it was believed such lands were state controlled, but with the suggestion that the question be adjudicated definitely in a federal court.

Mr. Blue says previous decisions indicate tideland mineral rights, which include oil, are inherent with the federal government. He considers the state of California to be exercising squatter's rights on public lands which belong to the United States.

The attorney general, Mr. Blue said, should protect the federal government's interest in an estimated $4,000,000,000 in oil pools upon which the state and lessees are now encroaching.

Motion in Osage Suit

Four oil companies charged in government suits with illegally deducting 3 per cent of the purchase price of oil from Osage Indian lands filed motions in federal court in Tulsa asking the actions be transferred from the equity to the law division. The law division offers all the recourse to which the Osages are entitled, according to the motions, which were filed by Stanolind Pipe Line Co., Stanolind Crude Oil Purchasing Co., Oklahoma Pipe Line Co. and Carter Oil Co.

Yates Proration Suit

HOUSTON, Tex.—A three-judge federal court refused to grant a temporary injunction restraining the Railroad Commission from enforcing a proration order in the Yates oil field in West Texas, sought by the Ohio Oil Co., alleging the proration rule was discriminatory. The court set the case for hearing on its merits. Tentative date is Feb. 11.

Order Meters on Plants

AUSTIN, Tex.—Metering of all gasoline plants has been ordered by the Texas Railroad Commission to double its check on the use of natural gas in these plants. Plants must install meters on incoming and outgoing lines so a check will be possible on the gas processed, the residue and disposition of the residue.

Dickinson's Talk Read for Bearing on Antitrust Suit

DR. JOHN DICKINSON—*Assistant U. S. Attorney General, in charge of the Madison antitrust investigation who resigned from the Department of Justice*

WASHINGTON, D. C., Dec. 28.—The resignation of John Dickinson as assistant attorney general in charge of the antitrust division of the Department of Justice has focused attention on proposals for sweeping changes in the antitrust laws.

In fact Doctor Dickinson himself made a speech exactly two weeks before his resignation was announced in which he criticized these laws in a manner suggesting dissatisfaction with the government's price-fixing suit against oil companies now pending at Madison, Wis.

In this speech, before the Council for Industrial Progress—the "Berry conference"—Doctor Dickinson pointed out that in many industries relatively uniform and stable prices may exist as the result of economic conditions and long-practiced customs and do not constitute any violation of the antitrust laws. Many listeners read into these remarks an admission of the futility of antitrust proceedings against the sort of price uniformity which prevails in the oil industry and against which the Department of Justice is directing its Madison case.

CHIEF POINTS

The chief points made by Doctor Dickinson, who is a former college professor and served for a while as assistant secretary of commerce, were that the antitrust laws are technical and limited in their application and do not permit giving any consideration to economic conditions in an industry nor to the general social benefits of certain practices which they outlaw.

In veiled terms he criticized both the theory of the antitrust laws and the manner of their enforcement by the Department of Justice, and he left the suggestion that they should be entirely rewritten and administered by an agency made up of economists rather than lawyers.

In this swan song speech the assistant attorney general may have been doing little more than apologizing for the relative inactivity of the antitrust division in recent years and seeking support for bigger appropriations, for he pointed out that the antitrust laws cannot have the effects many people expect unless the Department of Justice is given a much larger staff of investigators. A more probable interpretation, however, is that Doctor Dickinson was forecasting new legislation for regulation of business to be proposed by the administration shortly. It is understood the forthcoming annual report of the attorney general will include some interesting remarks on the antitrust laws.

With the pending Madison oil suit directed against price uniformity which the defendant companies claim is caused by marketing practices and not an illegal conspiracy, Doctor Dickinson's remarks on price rigidity and price uniformity have special significance. In discussing popular misconceptions of the scope of these laws, he said:

"It must be understood that the antitrust laws do not outlaw business practices and price policies merely because such policies may operate to make prices relatively rigid or to discourage price wars and market breaks. We have had much discussion in recent years of the problem of so-called rigid prices. One of the most valuable by-products of the great depression has been the stimulus it has given to a better and more thorough understanding of the workings of our present economic system, and as we have achieved that understanding students and analysts have pointed out that in many of our industries prices have a tendency to remain relatively stable over long periods of time while in other lines of business they fluctuate more or less violently.

PUBLISHED PRICE LISTS

"From certain standpoints it has seemed to many observers that so-called rigid prices constitute an evil, and attention has been called to the fact that such rigidity often results from the existence in an industry of certain types of pricing policies, such as adherence to published price lists, the practice known as 'following a leader,' the practice of selling only on delivered prices, and the like. Because of the effect of these and other practices in promoting price rigidity they are often referred to as in an economic sense 'monopolistic,' and the inference is therefore drawn that they must constitute a violation of the antitrust laws.

"It is, of course, entirely true that practices of this character in many instances may result from conduct which does violate the antitrust laws, but that is obviously an altogether different thing from saying that such practices violate the antitrust laws in and of themselves. As a matter of fact, in the antitrust laws, as they now stand, there is nothing which makes price rigidity unlawful or which outlaws practices that result in price rigidity, unless such practices happen to be the consequence of definite concert or agreement which is unlawful because it violates the prohibitions of the antitrust laws against concert and agreement of certain kinds. Where, on the other hand, price policies and business practices which may happen to promote price rigidity are not the result of such unlawful concert or agreement, but have merely grown up in an industry as a by-product of the adaptation of the various members of the industry to the conditions of the competitive struggle existing in that field, there is no prospect of a successful prosecution, because the courts do not construe the antitrust laws to outlaw such practices. If there are those who believe that price rigidity and practices which promote it are contrary to public policy, they must appeal to congress for legislative action rather than to the Department of Justice for antitrust proceedings."

ECONOMIC AND LEGAL

This same difficulty of distinguishing between economic conditions and legal technicalities was discussed again by the assistant attorney general when he said: "When speaking of such matters as price rigidities we saw that these furnished no ground for illegality if not the result of deliberate concert. The same thing is true of price uniformities. Accordingly, if the concert which underlies price rigidities and price uniformities is secret and concealed with care, it is often extremely difficult to distinguish the resulting situation from one which may be perfectly legal. Only by the most elaborate and painstaking kind of investigating work, going constantly hand in hand with economic analysis of the practices of the industry and the history of those practices, can the distinction ultimately be drawn and the illegal element of concealed concert brought definitely to light."

These and similar passages in Doctor Dickinson's speech suggest that at least he, if not his superiors in the administration, favors new laws for the regulation of business, laws which would rest on the economic effects of business practices rather than on the technical existence of a provable agreement among competitors.

Under such an approach the enforcing agency would have power to approve practices leading to price uniformity even in cases where agreements were made among competitors, provided such uniformity were found to be best for the industry and for the public. On the other hand, the enforcing agency would have power to break up price and marketing practices found to be against the public interest as defined by the rewritten law, even where no conspiracy or concert existed.

QUESTION OF BIGNESS

Food for thought is also contained in another passage from Doctor Dickinson's speech in which he said:

"There is apparently a widespread belief that the antitrust laws direct their legal prohibitions against bigness in business as such, against competitive practices in general whenever exerted by large-scale business organizations or great aggregations of capital to the disadvantage of smaller rivals, and against all price policies, particularly when pursued by large concerns, which may operate to minimize price wars or to mitigate declines in the price of the product. Many people apparently believe that all these things are illegal.

"It is essential to understand that, as the antitrust laws have been construed by the courts, the mere size of a concern and the proportion of the market which it supplies do not of themselves constitute a violation of law. Nor, as a general proposition, is it unlawful for large concerns in the ordinary course of business, and as participants in the competitive struggle, to engage in competitive practices on the same terms as their smaller rivals so long as their conduct is simply directed toward the pursuit of their legitimate business advantage and not directly aimed at the suppression or destruction of competition in an illegitimate manner.

In other words, as the antitrust laws stand, they do not make mere bigness in business unlawful, nor do they in general place upon the large business concern, because it is large, any special limitations in the competitive struggle which are not placed upon the smaller concerns also. If there are those who believe as a matter of policy that bigness should be shackeled and subjected to special advantages they cannot hope to see their objective in many of its aspects accomplished merely by the enforcement of the antitrust laws, but must seek for new legislation at the hands of congress by convincing that body that sound legislative policy requires the adoption of their views."

One further passage from this now important speech seems to be a forecast of a revamping of the entire body of law affecting business practices. Doctor Dickinson said:

"In the case of agreements between competitors it now seems to be well settled by the courts that the legality of such an agreement between competitors with reference to their competitive conduct or their relations to their customers is not necessarily saved by the validity of the economic considerations which it is designed to serve. Here, assuming that an agreement is as broad as the market, the test seems to be almost entirely the directness with which it operates to cause interstate business to be carried on in a manner different from that which would prevail in the absence of the agreement; in other words, upon whether the agreement operates to alter a significant relationship in commerce. Thus, if an agreement operating over practically an entire market prevents buyers from enjoying a privilege which they previously enjoyed, or affects price, or prescribes a term in a contract, it may be said with some degree of assurance that the agreement irrespective of the possible soundness of its economic results is an unlawful restraint of trade."

Apparently what Doctor Dickinson favors is some authority in law for a federal agency to approve of industry-wide agreements limiting competition and defining fair trade practices provided such agreements are for the good of the entire industry and of the general public.

As a parting shot, Doctor Dickinson declared that the antitrust laws, as they now stand, can be enforced only by appropriating sufficient money to provide a large staff of economic analysts, and he suggested that the results might not justify the cost. "Either the machinery for enforcement of the antitrust laws must be expanded, or some other and different machinery for the accomplishment of the purposes of those laws must be devised. I have said nothing about the large and inspiring purpose which underlies them, the prevention of arbitrary monopolistic power, the oppression of the weak by the strong, the protection of the interests of the consumer, and the protection of the right of labor. As to those larger purposes there is no room for disagreement. The problem with which statesmanship is today confronted is to translate those purposes into practical effectiveness, either through the enforcement of existing legislation or through the formulation of appropriate amendments."

THE MARKETS*

CRUDE OIL: ***Pennsylvania Grade crude advanced 12 cents in Bradford and Allegany fields and 15 cents elsewhere. Probability of general advance heightened, though opinions vary as to date and size of increase. Market tight.***

REFINERY: ***Whole list of burning oils exceedingly strong, with prices rising. Kerosene vigorous. Gasoline demand unusually high for this time of the year, but market somewhat unsettled owing to uncertainty over crude prices. Natural gasoline weak except on Pacific Coast.***

TANK-WAGON AND SERVICE STATION: ***Gasoline advanced fractionally by Socony-Vacuum throughout its territory. Kerosene up at scattered points. Course of retail prices depends on cost of crude.***

FINANCIAL: ***Oil shares among the leaders, with some issues recording new highs for the year. Average of 30 representative oil stocks for week ending December 24: High, 41.00; low, 37.64; close 40.62. Week ending December 19: High, 40.08; low, 38.06; close, 38.43.***

*Detailed information in Market Section.

New Records in Car, Bus and Truck Registration

Seven new automotive records were established during the year just closing according to Alfred Reeves, vice president and general manager of the Automobile Manufacturers Association in releasing its preliminary annual report on production and registration.

"The automobile industry is entering 1937 with more motor vehicles in operation in the United States than ever before," Mr. Reeves announced. "A survey made with the cooperation of motor vehicle departments in every state has revealed there were approximately 28,270,000 motor vehicles registered for operation during the past year. This exceeds by nearly 1,500,000 units the previous record established in 1930. Since all types of vehicles shared in this increase, record registrations of passenger vehicles, trucks and buses are indicated."

World motor vehicle registrations, he added, are also at an all-time peak of 40,000,000.

"Not only were there more vehicles in operation in the United States than ever before but, accepting gasoline consumption records as an index of highway travel, it can be said that the use of motor vehicles was at a record level," Mr. Reeves reported. "The year's gasoline consumption of 17,900,000,000 gallons was almost 10 per cent above the record set in the preceding year."

The commercial vehicle division of the industry accounted for another of the 1936 records with the number of trucks sold to consumers in the United States during the year surpassing 1929's record sales by nearly 100,000 units.

"The 1936 output of motor vehicles, accessories, service equipment and replacement parts and tires had an aggregate wholesale value of $3,626,612,000.

"While all of the records which I have mentioned are uniformly gratifying to those interested in the progress of the motor industry, there is another record that was established during the year which cannot be viewed with such satisfaction," Mr. Reeves said. "That is the record tax burden which users of the highway were compelled to pay. Figures now available indicate that highway users paid $1,400,000,000 in special taxes to federal, state and local governments during the year.

"There has never been any disposition on the part of the industry or the motorists to avoid the payment of taxes which would represent a fair share of the cost of highways. In spite of this, taxing agencies in some states have taken advantage of the motorists' readiness to pay their share of highway costs by imposing excessive taxes. In this connection, a tendency on the part of some governmental authorities to use motor tax funds for other purposes than their legitimate use in connection with highway costs cannot be too severely condemned."

NEW AUTOMOTIVE RECORDS

Total passenger car registration.
Total motor truck registration.
Total motor bus registration.
World motor vehicle registration.
Retail sales of trucks in United States.
Aggregate taxes paid by motor vehicle users.
Gasoline consumption.

PRODUCTION AND VALUE

Car and truck factory sales, U. S. and Canada	
Passenger cars	3,767,000
Motor trucks	798,000
Percentage increase over 1935	11%
Wholesale value of cars, U. S. and Canada	$1,991,300,000
Wholesale value of trucks, U. S. and Canada	457,625,000
Wholesale value of cars and trucks combined	2,448,925,000

REGISTRATION

Motor vehicles registered in U. S.	28,270,000
Motor cars	24,250,000
Motor trucks	4,020,000
World registration of motor vehicles	40,000,000
Per cent of world's automobiles in U. S.	71%

TAXES

Total motor vehicle user taxes	$1,400,000,000
Gasoline taxes, federal, state and municipal	880,000,000
Percentage motor user taxes to all taxes from all sources, federal, state and local	14%

GASOLINE AND OIL

Gasoline consumption by motor industry	89%
Gasoline used by motor vehicles (gallons)	17,900,000,000
Gasoline consumption by motor vehicles, retail value including taxes	$3,300,000,000
Lubricants used by motor vehicles (gallons)	535,000,000
Lubricants, per cent used by motor vehicles	57%

MOTOR TRUCKS AND BUSES

Motor trucks in use	4,020,000
Total special motor truck taxes	$354,000,000
Trucks represent 14% of all motor vehicles, and pay 25% of all motor taxes.	
Fleets of more than 5 trucks, no. of operators	29,500
Number of truck drivers	3,000,000
Communities served exclusively by trucks	48,500
Motor buses owned	120,000
Number of buses in revenue service	47,500
Number of buses in local or transit service	20,000
Consolidated schools using motor transportation	23,650
Buses used by consolidated schools	74,000
Buses used by street railways	12,000
Street railways using motor buses	190
Companies in city service including street railways	806
Steam railroads using motor buses	65

FOREIGN SALES

Number of American motor vehicles sold outside U. S. (U. S. exports and output in Canadian plants owned by U. S. firms)	501,000
Per cent of production sold outside U. S.	11%
Value of motor vehicles, parts and tires exported from U. S. and Canada	$265,000,000

Indiana Association Sets Date for Spring Meeting

The date for the spring convention and refiners' and suppliers' exhibit of the Indiana Independent Petroleum Association has been set for March 10 and 11, according to R. M. Stith, president.

The Indiana legislature will meet January 7 and a bulletin issued by the Indiana association recently urged jobbers to contact their state senators and representatives in connection with the following items:

Advocate elimination of the oil inspection law of Indiana, or a reduction in the fee from 4 cents to 1 cent per barrel.

Oppose diversion of taxes and fees from road construction maintenance and the retirement of road bonds.

Advocate elimination of gasoline sales from provisions of gross income tax.

Oppose private owners being included in 60-cent weight tax law.

Oppose private owners being included under any regulatory measures as now applied to certificate carriers.

Advocate a law for the collection of automobile license fees to conform with fiscal year (July 1 instead of January 1).

Advocate modification of gasoline tax bond law and fees imposed on licensed dealers.

January C.N.G.A. Meeting

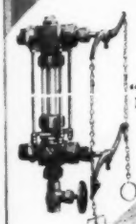
LOS ANGELES, Calif.—According to an announcement by Bill Robinson, program chairman of the California Natural Gasoline Association, the next meeting will be held at the Mary Louise Tea Room, Barker Brothers, Los Angeles, on January 7. Julian A. Campbell, consulting engineer, will present a paper entitled, "A New Method of Boiler Feed Water Level Control," in addition to which he will discuss general phases of boiler plant operation.

Another interesting item on the speaking program will be an outline of recent technological developments in the navy, delivered by Commander J. A. Murphy of the U. S. S. Oklahoma. Commander Murphy is an executive officer of the Pacific fleet, and will be accompanied by aides who will help him describe all the latest engineering devices now used by the battleships.

"SAFEGUARD" LIQUID LEVEL GAGE

Automatic Injector

Ejector, Syphon or Jet Pump


"Navy Type" Liquid Level Gage

"Safeguard" Automatic Liquid Level Gage

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Gas Engine Lubricator

Snap Lever Oiler

Plain Brass Oil Cup

Plain Compression Grease Cup

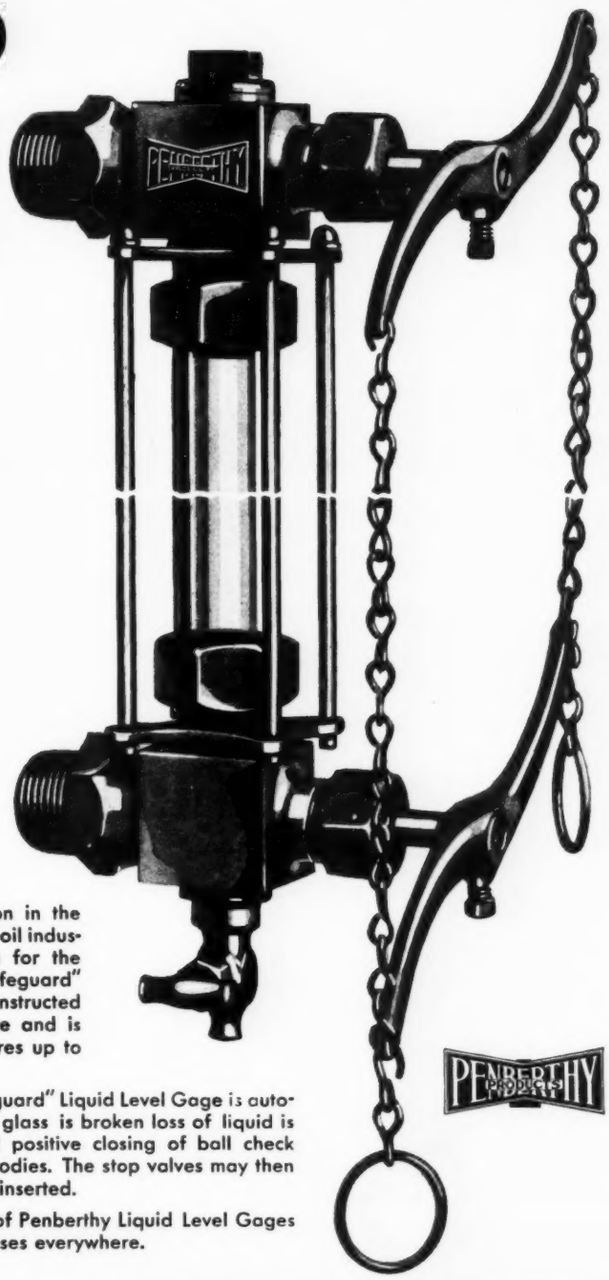
Screw Plunger Grease Cup

Spring Compression Grease Cup

Automatic Electric Sump Pump

Automatic Cellar Drainer (Water or Steam Operated)

Dipless Air Cock



ALL ★ THAT THE NAME IMPLIES

SAFETY is a primary consideration in the selection of equipment for the oil industry—that is an important reason for the popularity of the Penberthy "Safeguard" Liquid Level Gage. It is ruggedly constructed of high grade steam metal bronze and is recommended for working pressures up to 300 pounds.

Operation of the Penberthy "Safeguard" Liquid Level Gage is automatic and dependable. When the glass is broken loss of liquid is prevented by the immediate and positive closing of ball check valves in both upper and lower bodies. The stop valves may then be safely closed and a new glass inserted.

"Safeguard" and the other types of Penberthy Liquid Level Gages are carried in stock by supply houses everywhere.

PENBERTHY

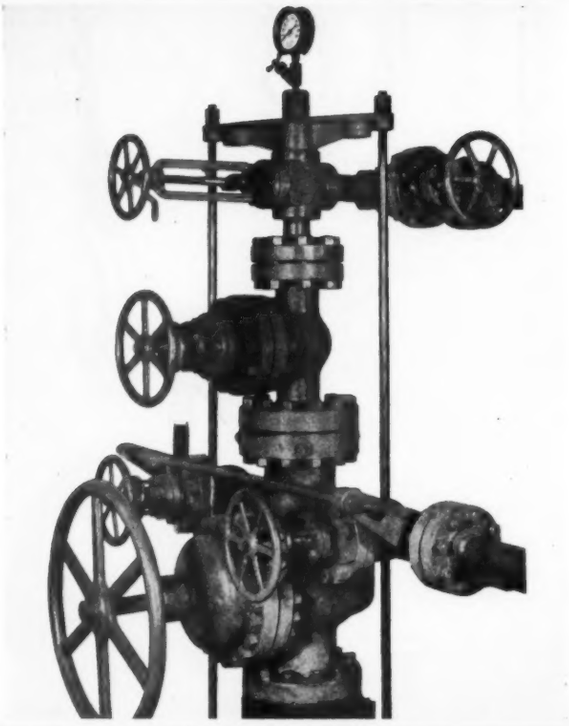
PENBERTHY INJECTOR COMPANY

Manufacturers of Quality Products since 1886

DETROIT, MICHIGAN — WINDSOR, ONTARIO

Your Christmas Tree is really complete with a

KEROTEST
CROSS TYPE CONTROL
CHOKE *or* NEEDLE VALVE



(*Licensed under Petroleum Engineering Research Co. Patents*)

Regardless how you lay out your Tree, it's smart practice nowadays to equip every Christmas Tree Assembly with a Kerotest Forged Steel Control Choke or a Kerotest Cross Type Full Flow Needle Choke for oil well production. It not only assures a positive shut-off but also affords the safest and most economical method of precision control on pro-rated wells and back pressures on sand producing wells. Your Christmas Tree will be more compact and more easily operated, too.

Designed with forged steel bodies and bonnet with a cast steel yoke, Kerotest Control Chokes are tested to 6000 pounds per square inch for working pressures up to 3000 pounds per square inch and are available in all sizes from 2 inches to 6 inches to meet every field condition and every design of hookup. Ask about it.

KEROTEST MANUFACTURING COMPANY
PITTSBURGH, PA.

KERO TEST

Texas and Louisiana Producers Enter Year With High Output

By NEIL WILLIAMS

HOUSTON, Tex. — Texas and Louisiana producers enter the new year with their production steadily mounting. Increases in allowables for January are sending production in these states to new high levels. Indicated need for additional oil from these states, especially Texas, coupled with new wells and production being brought in at a rapid rate, foretells continued swelling of daily output.

Combined allowables of Texas and Louisiana, based on proration schedules the past week, will be 295,058 bbls. greater on January 1 than at the opening of 1936. The increase in Texas will amount to 223,108 bbls. while that in Louisiana will be 71,950 bbls. The increase in Louisiana is much greater relatively than that of Texas, amounting to approximately 43 per cent.

Allowable production of Texas for January 1 has been set at 1,248,907 bbls. This is based on an estimated allowable of 447,861 bbls. for East Texas, which is subject to correction depending on the number of producing wells. On January 1, 1936, actual allowable production for Texas was 1,025,799 bbls. Louisiana proration schedule provides for a daily allowable in January of 240,650 bbls. compared with 168,700 bbls. for January, 1936.

The upward trend in allowable in these states is indicated in the following tabulation showing the state proration orders, as well as the Bureau of Mines estimates of demand:

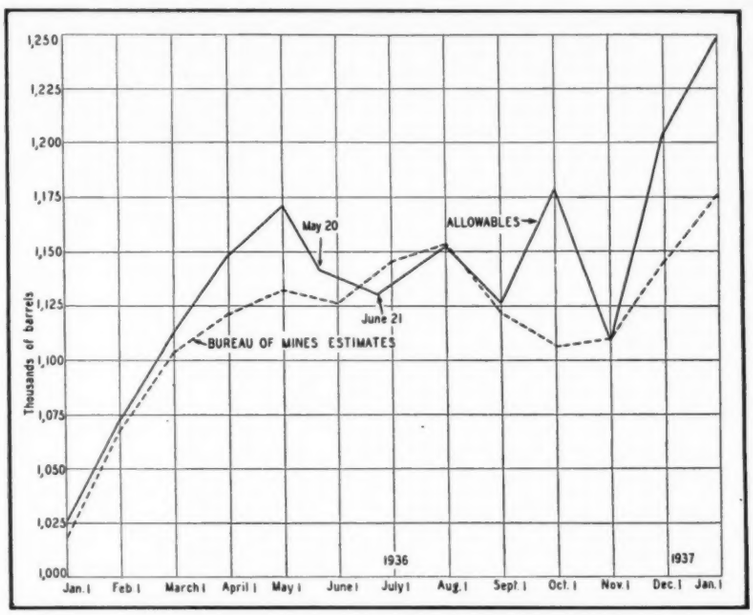
TEXAS

	State allowable (bbls.)	Bureau of Mines estimate of demand (bbls.)
January 1, 1936	1,025,799	1,017,200
February 1	1,073,484	1,068,200
March 1	1,113,100	1,104,000
April 1	1,148,809	1,122,800
May 1	1,171,574	1,132,500
May 20	1,141,700	.....
June 1	(*)	1,125,700
June 21	1,130,214	.....
July 1	(*)	1,146,500
August 1	1,153,962	1,154,700
September 1	1,125,799	1,123,900
October 1	1,179,948	1,106,900
November 1	1,109,260	1,109,300
December 1	1,204,395	1,145,200
January 1, 1937	†1,248,907	1,176,000

*No general new order issued. †Based on estimated allowable of 447,861 bbls. for East Texas.

LOUISIANA

	South Louisiana (bbls.)	North Louisiana (bbls.)	Total state (bbls.)	Bureau of Mines estimate demand (bbls.)
January, 1936	127,700	41,000	168,700	132,600
February	128,550	52,500	181,050	141,100
March	130,850	56,000	186,850	151,400
April	137,475	65,000	202,475	160,900
May	141,975	70,750	212,725	170,500
June	146,225	70,750	216,975	175,700
July	149,990	74,910	224,900	186,800
August	153,250	77,000	230,250	188,500
September	155,200	80,000	235,200	186,200
October	155,200	80,000	235,200	189,300
November	155,850	82,500	238,350	198,600
December	155,850	82,500	238,350	204,800
January, 1937	157,150	83,500	240,650	216,300



Texas allowables, Bureau of Mines estimates for 1936

In Texas the proration schedule reflects the allowable only on the date indicated by the order. In some fields, particularly East Texas, allocation is by wells rather than fields. Completion of new wells and special increases granted specific fields result in substantial increases in the total daily allowable between orders. Such increases have raised the daily allowable as much as 50,000 bbls. during a month. Louisiana allowables allocated by fields are unaffected by addition of new wells.

Louisiana's allowable production has consistently been above the Bureau of Mines estimates. During January, 1936, the excess amounted to 36,100 bbls. daily. This excess reached its peak in May, 42,225 bbls. over the bureau's recommendations. The January, 1937, allowable will be only 24,350 bbls., the closest in line this state has been for a year. During recent months the administration has shown a greater inclination toward cooperation with other states, and lately this state's threat to production stability has been dissipated to a large extent.

On the other hand, the divorcement of Texas allowable from the Bureau of Mines recommendations has come largely within the past several months. The Railroad Commission stepped up the October 1 allowable to 1,179,948 bbls., 54,149 bbls. over September 1, and 73,048 bbls. over the Bureau of Mines estimate for October. In November Texas reduced its allowable in line with the bureau recommendations but in December and the allowable for January the bureau again has been ignored.

TEXAS DISTRICT ALLOWABLES

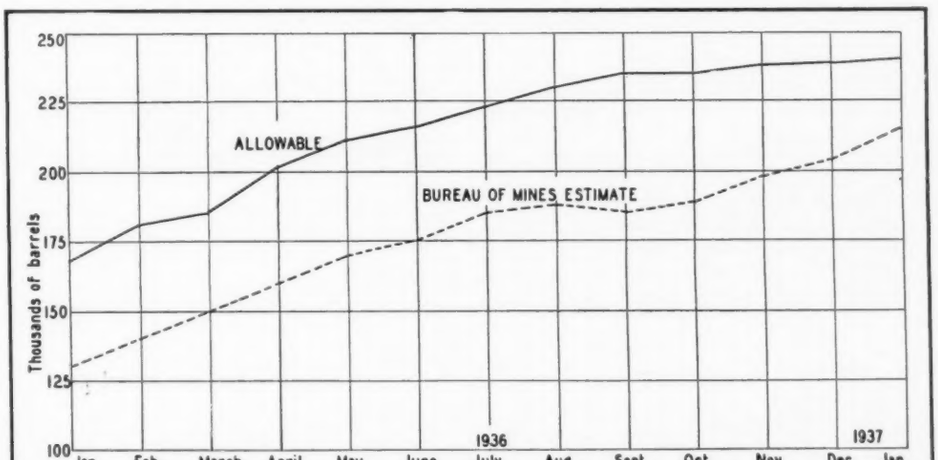
The January 1 state allowable is 72,907 bbls. above the Bureau of Mines, 44,513 bbls. over the December state allowable, and 18,472 bbls. above that of December 18. Allowables by districts are shown in the following table:

	Allowable		
District—	Jan. 1, 1937 (bbls.)	Dec. 18, 1936 (bbls.)	Dec. 1, 1936 (bbls.)
Southwest Texas	187,507	186,475	179,724
Gulf Coast	176,151	172,985	169,242
East Central Texas*	62,747	61,954	60,377
Rodessa	29,125	27,439	21,882
East Texas field	†447,861	446,126	444,034
West Central Texas	60,005	59,999	58,051
West Texas	151,026	150,849	147,414
North Texas	63,150	62,711	62,336
Panhandle	71,335	61,897	61,335
Total	1,248,907	1,230,435	1,204,395

*Exclusive of Rodessa and East Texas field. †Estimated—actual allowable dependent upon number of producing wells January 1.

Much concern has been manifest by many Texas operators over the large number of new wells being brought in, reducing the average per well allowable. Unless substantial increases are made in total allowable or completion rate is curtailed, operators face the possibility of reduction of production to a marginal allowable.

(Continued on Page 52)



Louisiana allowables, Bureau of Mines estimates for 1936

For a better 1937

Dubbs refiners had a good year in 1936 and many are increasing their Dubbs-cracking capacity to make 1937 even better

If you got by this year without Dubbs-cracking it's a tribute to your ingenuity—and your luck

But how well did you get by?

Don't bet too much on your ingenuity alone—don't push your luck too far

Put in Dubbscracking and be sure

Then 1937 will be a better year for your stockholders and your customers

And for you

Happy New Year

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

New Rodessa Order Provokes Controversy by Producers

SHREVEPORT, La.—The text of the Louisiana commissioner of conservation's new order governing production at Rodessa, which is to go into effect January 1, was made public during the week. The order, as previously reported, provides for allocation of production on a 50 per cent acreage and 50 per cent bottom-hole pressure basis, with a gas-oil ratio of 2,000 to 1.

The order further classifies all distillate wells (those making a fluid of gravity higher than 51 degrees A.P.I.) as gas wells, and states "no well shall waste, burn, or blow into the air an amount of gas of more value at 3 cents per thousand feet than the market value of the oil recovered."

Furthermore, the manner of casing and completing wells is regulated, together with stipulations regarding tubing sizes, kinds of equipment, and other safety measures to observe in drilling and completion of wells. Regulations are also made pertaining to crooked holes, restricting the degree of deviation from vertical.

The earlier order providing that "no two horizons capable of producing oil and gas, or either of them, shall be left open in the same well unless such horizons are naturally interconnected in such a manner as to prevent practical separation." Gas meters are required on all wells, of type approved by the commissioner of conservation, and all meter records are to be made available to the commission. Provision is made that deficiency of production of one well on a lease cannot be made up by any other well.

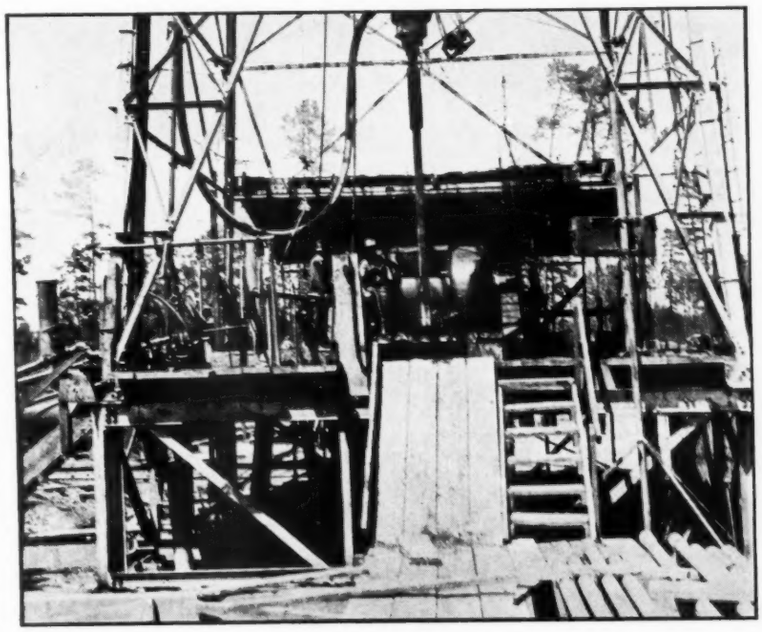
The producing schedule shows a producing area of 5,518.2 acres and total bottom-hole pressures of 490,772 pounds, or a numerical average of 1,686.5 pounds, as of November 27. Total field allowable is set at 62,500 bbls. for January, 1937, and the per acre allowable will therefore be 5.6630 bbls., and the bottom-hole pressure allowable 0.0637 bbls. per pound pressure. Stipulation is made, however, that a minimum acreage assignment of 5 acres will be given all wells having less, thus taking care of the townsite producers.

NEW REGULATIONS

These new regulations apply to production of oil and gas or either of them from Glen Rose producing horizon of the Rodessa field. The new rules set forth in detail requirements to be observed in drilling and completion of wells. The casing program provided for a minimum of 100 feet of surface casing properly cemented. The time allowed for cement to set has been placed at a minimum of 24 hours. The usual orders issued by other conservation commissions place this minimum at 72 hours.

At least 2,000 feet of casing must be set and cemented for the second string and before plug is drilled test must be made by displacing the mud in the hole by clear water and then applying a pump pressure of at least 800 pounds per square inch. If at the end of 30 minutes the pressure gauge shows a drop of 150 pounds or more the operator is required to take such corrective measures as will insure this string being so set and cemented as to withstand this hydraulic pressure test.

The producing string shall be new casing mill-tested to at least 2,000 pounds per square inch and set at a sufficient depth to cut off all gas formations above the oil-saturated horizon in which the well is completed. Cementing shall be done by pump and plug method. Sufficient cement shall be used to fill the annular space behind the casing up to a point within 3,000 feet of the surface. This cement shall be allowed to stand a minimum of 24 hours under pressure and a minimum of 72 hours before drilling plug or initiating test. The rules and regulations provide that the operator shall obtain casing clearance permit from the conservation commissioner's agent before completing the well. This discretionary power delegated to agents of the commission has in the past caused difficulties when improperly applied and this feature of the new rules and regulations may be contested by some operators as being too general.



Drilling well at Rodessa

After designating the casing strings to be run and cemented the order goes on to specify type of well-head connections to be used tested to 5,000 pounds pressure and a blowout preventer together with necessary fittings must be installed on the second string. All wells shall be equipped with bradenhead on the second string having a working pressure of not less than 1,500 pounds per square inch.

UP TO COMMISSIONER

All wells shall be cleaned into a pit not less than 150 feet from the derrick floor and at least 150 feet from any other fire hazard. Each operator shall notify the conservation commissioner's agent at least 24 hours before completing a well. "If said well is completed by the operator in conformity with the conservation commissioner's regulations, a completion certificate shall be issued to such operator. Completion certificates shall be withheld until the well has been completed in accordance with the conservation commissioner's rules. Pipe line companies and all other purchasers or carriers are forbidden to accept oil or gas from any well until such well is cleared by completion certificate."

In addition to these rules and regulations the commission requires the filing of a certificate of well survey and limits of deviation from the vertical are provided in the rules based upon the relative position of the well to the property lines.

Swabbing and drill-stem tests can be made during daylight hours only and proper precautions must be taken to reduce fire hazards to a minimum.

There are 10 equipment rules governing the tubing size and position in flowing wells, requiring that a separator be provided for handling gas and oil from the well, and it is specifically stated "each operator shall be permitted to produce oil only by the use of equipment which results in the most efficient utilization of available natural energy in a manner to reduce waste." This requirement will lead to a lot of arguments.

Section 4 covers allocation of production. The total quantity of crude oil which may be produced lawfully each day from the Rodessa field shall be determined by the commissioner of conservation. Fifty per cent of this total daily allowable shall be allocated to producing acreage. The half of the total daily allowable assigned to acreage allowable shall be divided by the total producing acreage and the product of this division will represent the number of barrels of crude oil allowable per acre and this will then be multiplied by the acreage nominated or allotted to each well and the product of this multiplication for each well shall be the daily acreage allowable in barrels of crude oil for such well.

The other half of the total daily allowable for the field shall be allocated by the use of a bottom-hole pressure. The bottom-hole pressures of all wells shall be added together and the total bottom-hole pressure for the field shall be divided into the daily allowable in barrels.

CALCULATING ALLOWABLE

As stated, the producing area of the Rodessa field is 5,518.2 acres and the total bottom-hole pressure 490,772 pounds. The numerical average bottom-hole pressure is 1,686.5 pounds as of November 27. The field allowable for January, 1937, is 62,500 bbls.

Following the rules quoted, the total field allowable is first divided by 2 to represent 50 per cent to acreage and 50 per cent to bottom-hole pressure.

The next step is to divide 31,250 bbls. by 490,772, total bottom-hole pressure, and the quotient is 0.0637 bbls. per pound pressure. This factor is then multiplied by the actual bottom-hole pressure of the well in question.

To secure acreage allowable, 31,250 bbls. is divided by 5,518.2 acres and the answer is 5.663 bbls. per acre.

The order provides no well drainage is to be based upon less than 5 acres nor more than 40 acres. The actual bottom-hole pressure for each

well will vary but the average pressure for the field as of November 27 was 1,686.5 pounds.

For a 5-acre tract the new allowable may be:

5.663 × 5 = 28.305 bbls. acreage allowable.

1,686.5 × .0637 = 107.43 bbls. bottom-hole pressure allowable.

28.305 + 107.43 = 135.735 bbls. allowable for a 5-acre tract.

For a 40-acre tract the new allowable may be:

5.663 × 40 = 226.52 bbls. acreage allowable.

1,686.5 × .0637 = 107.43 bbls. bottom-hole pressure allowable.

226.52 + 107.43 bbls. = 333.95 bbls.

On this basis the owner of a 40-acre tract will be allowed to produce 68¼ per cent more oil than the owner of a 5-acre tract, whereas the difference in size between the two tracts is 1,250 per cent. In other words, the 40-acre tract is eight times larger than the 5-acre tract, and if each tract has under it an equally saturated body of sand the small tract is securing a great deal more than its just proportion of the actual oil in place. While this is very favorable to the small tract owner, it may be contested by the owners of larger tracts and royalty owners might test this rule in court to determine if they are entitled to a fair share of the oil in place under the larger tract of land.

Expressed in another way, if there is an average of, for example, 40,000 bbls. of recoverable oil under each acre in this field, the owner of the 5-acre tract would have 200,000 bbls. of oil in place, but the owner of the 40-acre tract would have 1,600,000 bbls. of oil under his land. Producing at the respective rates of 135 and 334 bbls. per day, the owner of the small tract could recover his oil in 4.15 years, while it would take the owner of the large tract 13.2 years to get all of his oil.

This change in manner of allocation grew out of the public hearing held in Baton Rouge on November 27, and conforms rather closely to recommendations made by major operators in the field. Independent operators as a whole are opposed to the order and are calling upon the governor to meet with them for reconsideration of the matter, but no response has been made to this plea from administrative circles. Officials of the newly organized Louisiana Independent Oil and Gas Association have given notice they will not only take this particular order to court, but will attack the validity of the entire proration set-up in Louisiana, and battle lines are being drawn for a long fight, perhaps similar to many others where acreage has entered into the manner of production allocation.

Mid-Continent Oil Men Plan Trip to World Petroleum Congress at Paris

A group of Mid-Continent oil men is making plans to attend the second World Congress of Petroleum in Paris, France, June 14 to 19, 1937. The party, which may exceed 100, is expecting to formally present an invitation to the congress to come to the United States in 1940 and hold a meeting in conjunction with the twelfth International Petroleum Exposition in Tulsa.

W. G. Skelly, president of the exposition, informally presented an invitation to the Institution of Petroleum Technologists at its meeting at the American Petroleum Institute in Chicago in November. The congress is sponsored by the institution, which has its headquarters in London.

The French division is sponsoring the congress in 1937. Dr. C. K. Francis, who represented the institution as chairman at a meeting in Tulsa held during the 1936 exposition, and Dr. Gustav Egloff, honorary correspondent of the American division of the institution, have given Mr. Skelly assurance of support if the invitation is accepted. Doctor Egloff has sent President Skelly's invitation to Sir John Cadman, president of the institution in London.

The idea of Mid-Continent oil men attending the Paris congress grew out of the large attendance of delegates from distant lands to the International Petroleum Exposition each show since 1923. These delegates have urged American oil men to make reciprocal visits, and although a great number of executives have annually visited abroad, they have not gone as delegates from the United States to a foreign international oil gathering.

At the 1936 International Petroleum Exposition the French delegation offered a special invitation to American oil men to join them in Paris next June and take part in trips to French refineries and the Moroccan oil field.

The American representatives attending the congress will take with them a brochure showing the enlarged and improved exhibits which may be seen at the 1938 International Petroleum Exposition at Tulsa, May 14 to 21.

Readers interested are urged to write or contact President Skelly or W. B. Way, general manager of the International Petroleum Exposition.

Eastern District A.P.I. Meeting

Announcement has been made of appointment of committees for the spring meeting of the eastern district of the American Petroleum Institute's Division of Production May 6 and 7 in the Deshler-Wallick Hotel at Columbus, Ohio. The appointments, made by District Chairman J. C. Askam, Ohio Oil Co., Findlay, Ohio, follow:

Program Committee: Chairman George Wittmer, III, Wittmer Oil Co., Pittsburgh, Pa.; J. J. Schmidt, East Ohio Gas Co., Cleveland, Ohio; and F. E. Eckert, Hanley & Bird, Bradford, Pa.

Arrangement Committee: D. T. Ring, Ohio Fuel Gas Co., Columbus, Ohio.

Publicity Committee: H. J. Lowe, Pure Oil Co., Newark, Ohio.

Registration Committee: Christy Payne, Jr., Peoples Natural Gas Co., Pittsburgh, Pa.

Membership Committee: Chairman H. D. Atha, Gordon Oil Co., Mount Pleasant, Mich.; George Meyers, Sun Oil Co., Toledo, Ohio; E. H. Tollefson, Hope Construction & Refining Co., Clarksburg, W. Va.; C. D. Hunter, Kentucky-West Virginia Gas Co., Ashland, Ky., and John A. Thompson, Belmont-Quadrangle Drilling Co., Bradford, Pa.

OBITUARIES

DAN F. McCARTY, 66, executive secretary of the National Rig Builders of America, died in a Tulsa hospital December 27. During 1916-18 he served as warehouseman for the Empire Co. at Oil Hill, Tex. A year later he because associated with the Parkersburg Rig and Reel Co. moving to Tulsa as manager. He served in that capacity for 10 years. He was later associated with D. D. Wertzberger.

ALBERT BROWN, 72, pioneer figure in the oil well supply business, died in West Los Angeles, Calif., recently. He had more than 40 years service with Oil Well Supply Co., starting as store manager at Corning, Ohio, in 1887. Later he was in charge of Rocky Mountain division sales. For several years he resided in Tulsa, as head of the Mid-Continent division, and president of Beaver Oil and Gas Co., subsequently purchased by Sinclair. In 1907 he moved to Los Angeles where he served as vice president and general manager of Oil Well Supply Co. of California until retirement in 1927.

WALTER DOVE, 42, of the Imperial Oil, Ltd., staff at Sarnia, Ontario, died December 21.

WALTER J. EDMONDS, 67, executive vice president of International General Electric Co., died suddenly recently at Scarsdale, N. Y. He entered the employ of General Electric Co. in 1912 and in 1918 became chief traveling auditor. In 1919 he joined International General Electric Co. and became comptroller. In 1925 he was appointed financial vice president and in 1929 executive vice president. He was also a member of the board of directors.

S. LEWIS TUCKER, Jr., 38, controller of American Meter Co., died at the New Rochelle Hospital, N. Y., of a nose infection on Friday, December 18, after a brief illness of five days. He joined the treasurer's office of the company March 1, 1930. He was appointed controller January 1, 1935.

FRED R. SAVAGE, president of the 56 Petroleum Corp., and of the Bank of Miles City, died in Miles City, Mont. His company was one of the pioneers in the Cat Creek field in Montana.

TEXAS AND LOUISIANA

(Continued from Page 49)

In the first 11½ months of 1936 new wells completed in Texas totaled 9,163. On December 18 there were 67,810 producing wells, compared with 60,067 in January. There has been a steady increase in the number of wells each month. Railroad Commission reports for November and December have not been completed.

PRODUCING WELLS

	Flowing wells	Pumping wells	Total wells
January	23,583	36,484	60,067
February	23,655	36,681	60,335
March	24,152	36,921	61,073
April	24,573	37,278	61,851
May	24,877	37,716	62,593
June	25,455	38,051	63,506
July	25,685	38,394	64,079
August	25,986	38,816	64,802
September	26,407	39,023	65,430
October	26,765	39,471	66,236

The number of new wells completed in Texas by months is shown in Table 1.

In Louisiana high well allowables are being maintained, particularly in southern Louisiana, where there are about 860 producing wells, including marginal producers, which with a total allowable of 157,150 bbls. would make the average per well approximately 183 bbls. However, in flush fields, allowables range up to 1,000 bbls. a well in some fields, as at Lafitte in Jefferson Parish.

Louisiana allowables for January are being increased only 2,300 bbls. over December. Rodessa is left unchanged. The new schedule follows:

SOUTH LOUISIANA

	Jan. 1, 1937 (bbls.)	Dec. 1, 1936 (bbls.)
Iowa	17,500	17,500
Caillou Island	17,000	16,750
Leesville	13,250	14,250
Gillis*	18,000	17,750
Bosco	**9,500**	**10,000**
Lafitte	**9,500**	**8,900**
East Hackberry	8,500	8,500
Lake Barre	7,750	7,750
Tepetate	6,250	6,250
Roanoke	6,000	6,000
New Iberia	5,500	5,500
Sulphur	5,250	5,000
Others	33,150	31,700
Total South Louisiana	157,150	155,850

NORTH LOUISIANA

Rodessa	62,500	62,500
Others	21,000	20,000
Total North Louisiana	83,500	82,500
Total Louisiana	240,650	238,350

*Includes English Bayou.

TABLE 1

District—	Jan.	Feb.	Mch.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Southwest Texas	157	125	186	254	240	229	174	235	249	271	270	139	2,529
Gulf Coast	50	33	57	64	72	76	93	77	78	88	94	84	866
East Central Texas	...	...	...	1	1	9	10	6	1	5	2	2	37
East Texas district	2	2	9	10	15	14	19	43	57	57	77	49	354
East Texas field	224	164	269	266	222	234	247	201	106	189	187	80	2,389
West Central Texas	21	18	26	38	57	50	82	44	49	65	65	43	557
West Texas	65	38	72	75	84	89	118	102	125	122	110	80	1,080
North Texas	57	68	87	107	92	67	76	84	90	86	76	36	926
Panhandle	39	34	39	50	34	33	30	37	40	36	31	22	425
Total	614	482	749	869	817	801	849	829	795	919	912	535	9,163

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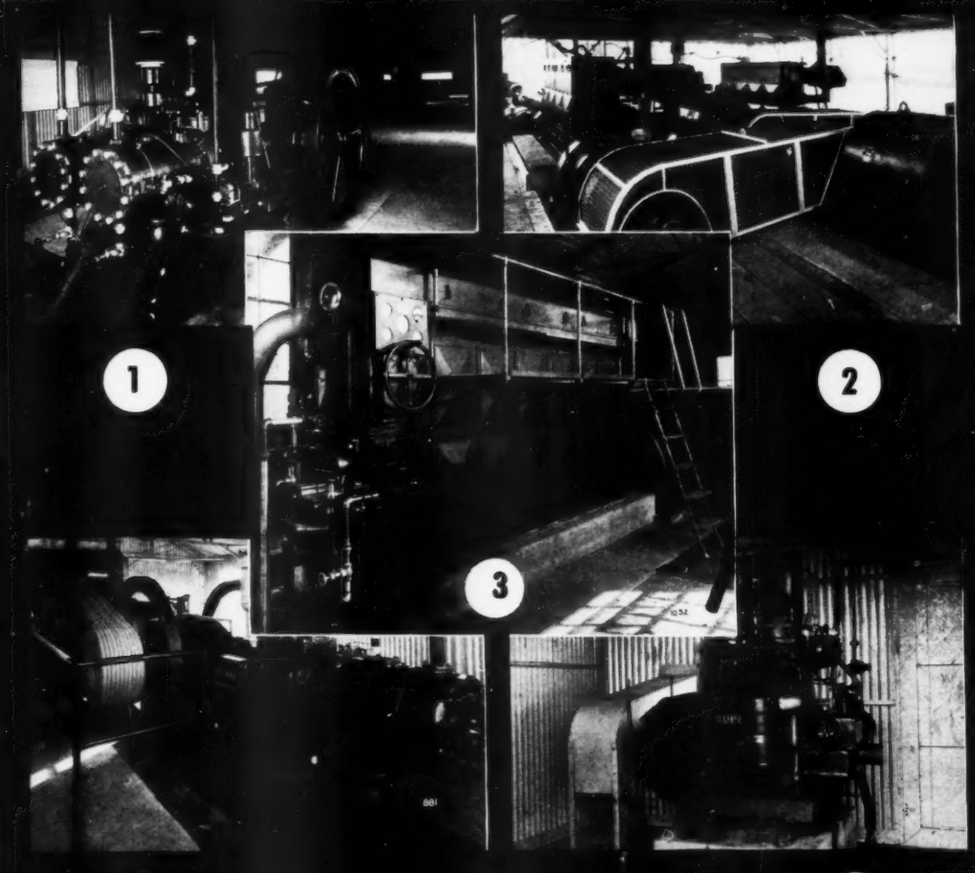

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Sobering Responsibility

World demand for petroleum established a new record in 1936. More than six per cent of the total consumption since 1859 took place during the past year.

Here in America where some had thought the saturation point in automotive use had been reached we find the biggest volume on record. Abroad, despite handicaps of unsettled conditions, official restrictions, heavy taxes, and resulting high prices for motor fuel, motorization goes steadily forward and consequently the consumption of petroleum.

Modern civilization has reached the stage, where in fact it can be said to be measured in petroleum. The more advanced countries become the more they need petroleum. Notwithstanding the increased production of crude in Russia the Soviet has been unable to maintain its exports because of growing domestic demand as the standard of living improves.

There are people today who are just coming out of the shadows of the kerosene age into the glare of the automotive period, looking up from the ox cart to the oil propelled voyager in the air. Every country making industrial progress swells the demand for petroleum. The hydrocarbon has become the most sought for compound in the modern world.

Outside of food and clothing petroleum is undoubtedly the most essential commodity in modern life. It is essential for national defense as well as for national progress. And, since progress depends upon it, its use must inevitably continually expand and grow.

World demand has made the petroleum industry a world industry. Record demand has been supplied by record production.

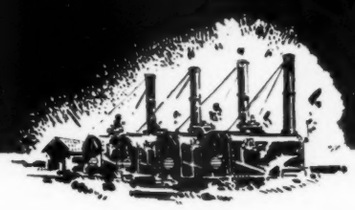
Amazing as this unprecedented increase in demand has been in the year now ending it should be sobering also. With every indication that consumption in 1937 will surpass even this year, and recognizing that new reserves must replace that supply, there is the question, where will it be found next year and the years to follow?

This responsibility rests upon the world oil industry which finds itself too often impeded by governmental restraints, excessive taxation, labor difficulties, or nationalistic policies.

A return to stability in Europe would mean an enormous expansion in which the superiority of oil for power, including the diesel engine, would immensely enlarge the present demand for petroleum.

If modern civilization is to continue to advance there must be an ever-expanding demand for petroleum on a scale that will dwarf the present. To supply that demand will continue to call upon the best minds, executive and scientific.

WHO IS N.G.E.



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Natural Gas Equipment Co. of Texas opens its Houston office in the Sterling Bldg., with an established background—an enviable reputation. N. G. E. has long enjoyed a close association as sales representatives for Surface Combustion Corp. of Toledo and the Webster Engineering Co. of Tulsa, as well as for the line of N. G. E.-Wilgus Pressure Regulators. On the Pacific Coast, Natural Gas Equipment, Inc. has for many years maintained offices in both Los Angeles and San Francisco, as well as complete manufacturing facilities in Los Angeles.

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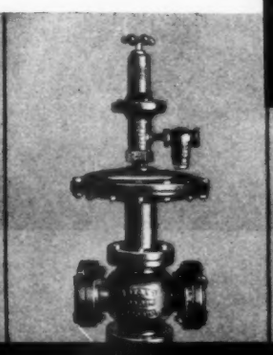

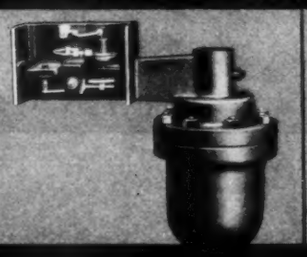

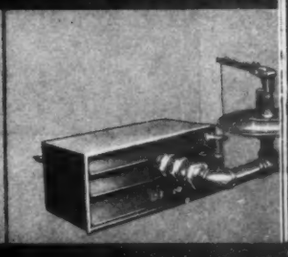

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Venezuelan Output 9 Per Cent of World

By H. STANLEY NORMAN

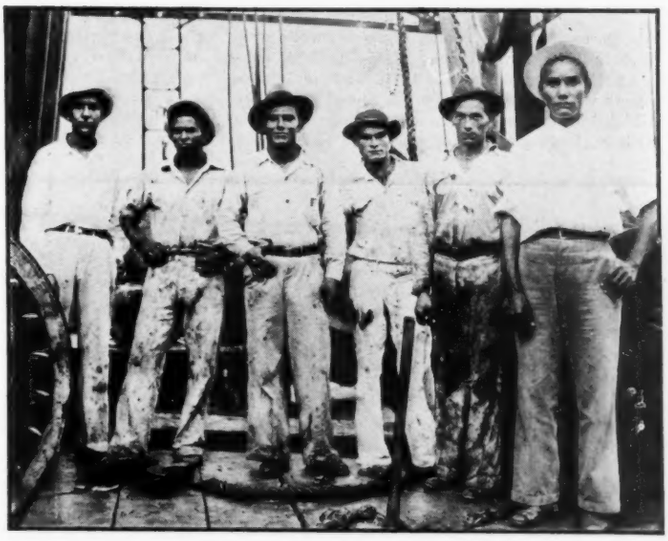
It is estimated that Venezuelan crude production in 1936 will reach a total of 161,795,000 bbls., a daily average of a little over 442,000 bbls. a day, or approximately 9 per cent of the estimated world's total crude output. Annual production figures follow:

	Total	Daily average	Per cent of world
1930	136,987,662	375,308	9.64
1931	118,878,971	325,696	8.64
1932	118,109,785	322,704	9.02
1933	120,442,222	329,979	8.35
1934	136,361,097	373,592	9.00
1935	148,889,404	407,916	9.03
1936 (est.)	161,794,569	442,062	9.01

Although Venezuela still ranks third in the producing countries of the world and again will make a new annual peak, its share of the world's total remains about the same as it has been in the past three years. In the year 1930 the country's share amounted to 9.64 per cent, which, to date, is the highest portion of the world's total it has attained. The accompanying table shows a comparison of production by fields for 1935 and 1936, together with the well data as of October 1, 1936. During 1936 one new area was placed on regular production when the first shipment of Amacuro crude was made from the Pedernales area on September 25.

Although Venezuela crude oil production will set another annual peak, estimated at 161,794,569 bbls. for 1936, the accelerated depletion of Lake Maracaibo wells to the pumping stage is focusing attention of producers and the oil fraternity in general on other parts of South America. While discoveries in eastern Venezuela so far are concentrated in Quiriquire and the Amacuro-Pedernales districts around the Gulf of Paria, broader areas in that part of the country are favorably regarded as a source for future Venezuelan crude oil production.

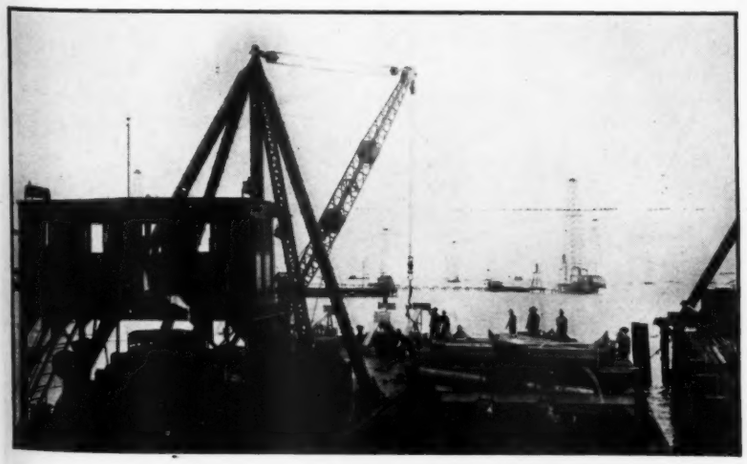
Spread of the intensive wildcat drilling program to unexplored parts of eastern Venezuela, with almost as much near previously drilled tests, lends credence to beliefs of some that encouraging oil indications already have been found. Lack of detail accompanies each wildcat drilling test in eastern Venezuela, but the persistent and often concentrated drilling of expensive holes is evidence that the area is regarded favorably. Entry of Socony-Vacuum Oil Co., Inc., to the list of wildcat acreage holders in eastern Venezuela during the middle of 1936 gave further cause to hold that part of the country in high regard. Socony-Vacuum obtained about 800,000 acres in the states of Monagas, Anzoategui and Guarico. In addition to payment of $2,000,000 cash, Socony-Vacuum assumed obligation to construct a refinery in Venezuela if the concessions prove productive. The company is now engaged in geological exploration of the acreage contracted and may enter the active quest for production in a few months when final exploitation concession titles are obtained.



Drilling crew of native Venezuelans, Standard Oil Co., Venezuela

Industrialization of Venezuela apparently has been adopted by the new administration under President Lopez Contrares and nationalization of the petroleum industry has been reflected in several 1936 developments. The Standard Oil Co. of Venezuela is committed to the construction of a 20,000- to 25,000-bbl. refinery on Venezuelan soil with announcement of the precise location expected in January or February. The company assumed the refinery construction obligation as part consideration for 500,000 acres of concession land in the eastern part of the country. Standard of Venezuela engineers are making subsoil tests and other investigations relative to water, waste disposal, shipping facilities, crude supply and population, before making a definite location selection. Most Venezuelan production is now refined on the islands of Aruba or Curacao, where Lago Oil & Transport Co., Ltd. (Standard Oil Co. of New Jersey) and Curacaosche Petroleum Industrie Maatschappij (Shell) have huge plants.

VENEZUELA



Motor boat loading Sampson posts, Lake Maracaibo

Venezuela had its labor difficulties in 1936, but most of the disputes and subsequent strikes were in June when a new petroleum law was under consideration. The present Venezuelan petroleum law imposes certain additional requirements on operating companies, but generally speaking they are acceptable under reasonable interpretation. Companies were required to supply additional hospitalization facilities and confine work to a six-day week. Compensation adjustments are now fully specified, to the advantage of both workers and employers. The government enacted a public-order law empowering officials to silence professional agitators.

The Lake Maracaibo district, headed by Lagunillas field, continued in 1936 to supply the big bulk of Venezuelan crude production, increasing its daily average yield to 305,721 bbls., compared to 281,636 bbls. in 1935. The increase of 24,085 bbls. in daily average output from the Lake fields was contributed mostly by Lagunillas, but a part came from La Rosa. The Ambrosia and Punta Benitez fields both declined slightly. The most significant development in the Lake district was an addition of 243 wells to the list of pumpers, increasing the total of those dependent on artificial lifting methods to 937. The drilling of 119 new wells in Lagunillas and 161 in all Lake fields, through September, 1936, resulted in adding 54 flowing wells, now totaling 332, against 278 at the end of October, 1935.

Outside of the Lake district, Standard Oil Co. of Venezuela's Quiriquire field, in the state of Monagas, proved the most productive in Venezuela. Based on average daily production of 64,733 bbls. in 1936, the field boosted its annual yield to 23,692,253 bbls., compared with 19,874,609 bbls. in 1935. Standard of Venezuela drilled 31 wells in

the Quiriquire field in 1936, making a total of 173 completed so far. Activity in the Mene Grande field, in the Sucre district, state of Zulia, was somewhat reduced in 1936, compared to 1935, but production increased to 44,401 bbls. daily against 42,494 bbls. in 1935. The Mene Grande field has two oil-producing levels. The most productive zone is a thick sand body, uniform over most of the producing area, which overlies Eocene shales and produces oil averaging 17 degrees Be. gravity. The second producing level, Eocene sandstone, yields 28- to 29-gravity crude. Nineteen wells were drilled in the Mene Grande field in 1936, compared with 32 completions in 1935. The field ended the year with more than 300 completed wells, out of which 125 are listed as inactive nonproducers.

Other fields outside of the Lake Maracaibo district showed only slight increases or declined from 1935 producing figures.

The drilling depth record for Venezuela now rests with Lago Petroleum Corp., which carried its No. 1 Icotea, 6 miles west of the Ambrosia field, near the center of Lake Maracaibo, to 8,750 feet. Failing to develop deeper commercial production, the hole was plugged back to 6,740 feet and was temporarily completed there for production of 1,850,000 feet of dry gas. In view of the gas production from depths not extensively explored in the Lake region, it is probable that at some future date further efforts will be made to obtain oil at greater levels in the Maracaibo district.

The previous depth record in Venezuela was held by Venezuela Gulf Oil Co. No. 1 Covir, in the district of Urdaneta, which was drilled in 1930. The deep test was apparently off structure and was abandoned without reaching conclusive beds.

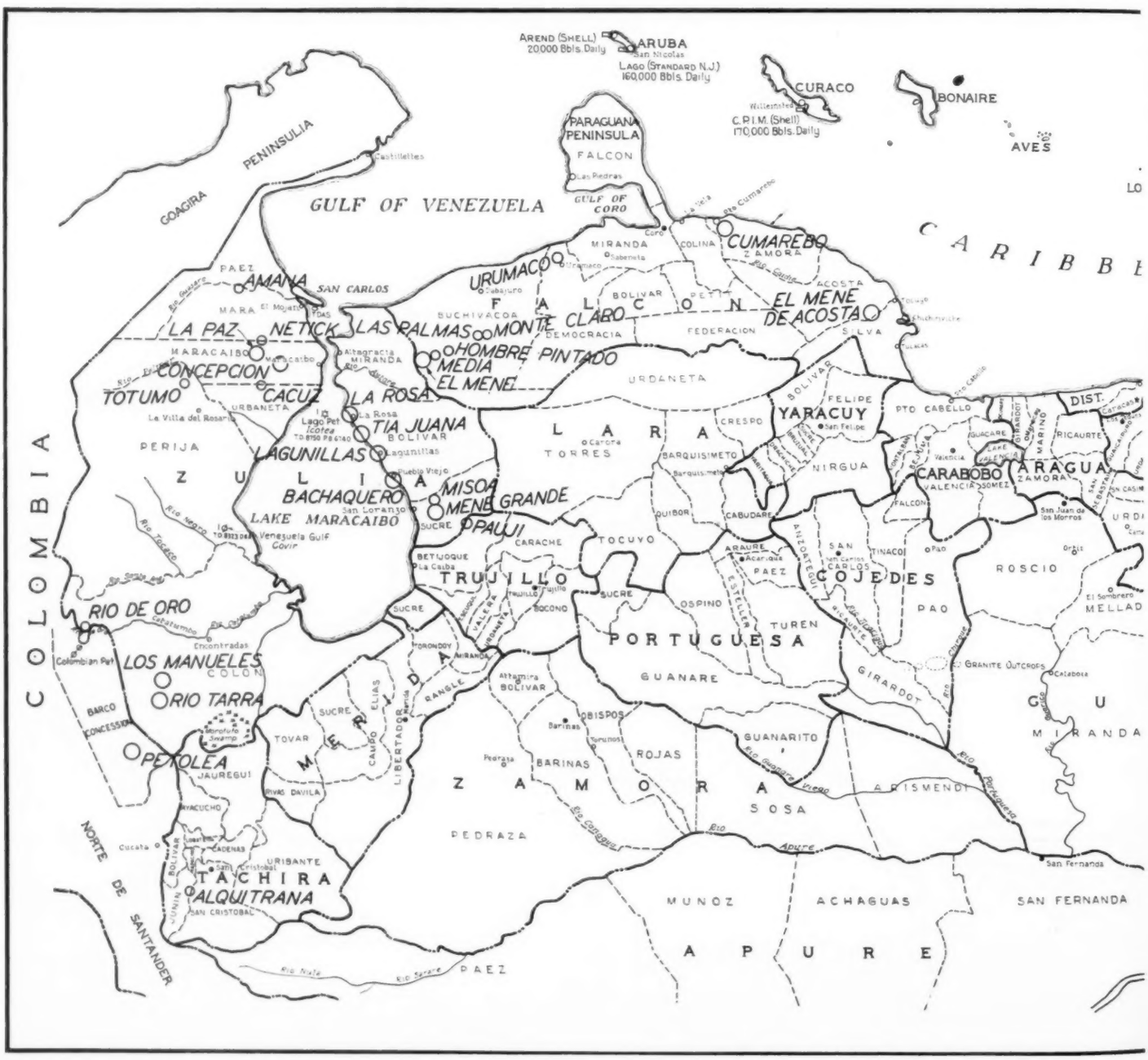
Wildcat exploration in eastern Venezuela, while scattered over a broad area, has been directed in a southwestern trend from the fields of Trinidad and Quiriquire. Most of the drilling has been along a broad belt across southern Monagas and trending approximately parallel with and 40 to 60 miles north of the Orinoco River. While development of actual production has been lacking, several tests drilled for geological information are suspended at depths too shallow to prove the prospects of the region. Drilling operations may be resumed on several of the suspended wildcat tests during the coming year.

Gas production at two wildcat points has been definitely proven by shallow wells near Maturin, in the state of Monagas, and by Venezuela Gulf Oil Co. No. 1 Santa Ana, 7 miles southwest of the village of Santa Ana in the central part of Anzoategui. Results revealed so far on Standard of Venezuela's Temblador and El Salto exploration have been inconclusive. Venezuela Gulf No. 1 Santa Ana may be carried deeper from its present shutdown depth of 6,207 feet, where the well is considered capable of producing 10,000,000 feet of gas daily.

In the district of Maturin, near the town of that name, Standard of Venezuela has proven ex-

VENEZUELA—PRODUCTION BY COMPANIES

	Lago. Pet. Corp.	Ven. Oil Concessions	Creole Pet. Co.	Venezuela Gulf Oil Co.	Caribbean	Standard of Venezuela	Colon Oil Corp.	British Controlled	North Ven. Pet., Ltd.
January	4,190,355	3,162,217	2,274,9..	1,364,000	1,417,878	.....	459,017	64,139	.....
February	4,136,887	3,225,869	2,311,330	1,355,000	960,915	.....	413,443	60,254	42,154
March	4,149,841	3,387,445	.....	1,320,000	1,011,685	2,551,231	427,335	63,000	65,536
April	4,289,743	3,174,090	.....	1,260,000	1,117,710	2,429,308	426,420	64,860	61,086
May	4,191,633	3,279,087	.....	1,271,000	1,289,352	2,636,284	449,493	63,984	62,142
June	3,713,529	2,917,020	.....	1,172,000	1,262,190	2,218,661	367,200	90,870	58,360
July	4,499,869	3,175,500	.....	1,229,000	1,438,000	2,756,606	371,200	82,646	60,352
August	4,539,212	3,125,900	.....	1,239,000	1,476,900	2,675,780	346,800	79,670	54,787
September	4,379,451	3,224,400	.....	1,270,000	1,519,600	2,743,219	339,400	69,240	51,166
October	4,574,360	3,119,313	.....	1,309,006	1,299,520	2,828,192	335,420	103,323	50,933
10 mos. total	44,665,080	31,820,781	4,586,257	12,790,006	12,793,750	20,834,281	3,905,728	741,986	506,516
10 months all companies,	132,649,385.								



istence of shallow, high-pressure gas production in its three holes drilled or drilling there. The No. 1 Maturin blew out, ignited and cratered when high-pressure gas was encountered at 919 feet. The well burned for several days and was finally extinguished through a relief hole drilled a short distance east. The company is now engaged in drilling No. 3 Maturin, a little south of the cratered hole.

Standard of Venezuela is also launched on its fourth of a six-well exploration program on property obtained for that purpose from the Pantapec interest. One test drilled by Standard of Venezuela on the Pantapec concession, the No. 1 El Lirial, was drilled to 7,401 feet and then plugged back and tested at an intermediate level, but without practical results. The company's No. 1 El Salto remains idle with the hole plugged back to around 4,400 feet, after having been originally drilled to 5,219 feet. The company is drilling below 2,000 feet on No. 2 El Salto, a short distance south of the suspended operation.

The most eastern test drilled in the Orinoco River belt is Standard of Venezuela No. 1 Tabasco (Pantapec), which is now proceeding at a shallow depth. The No. 1 Tabasco is the fourth test started on the Pantapec property by Standard of Venezuela.

Venezuela Gulf is starting an interesting test about 10 kilometers north of La Canoa, known as No. 1 Carapa.

In the district of Sotillo, state of Monagas, Standard of Venezuela is drilling below 3,600 feet

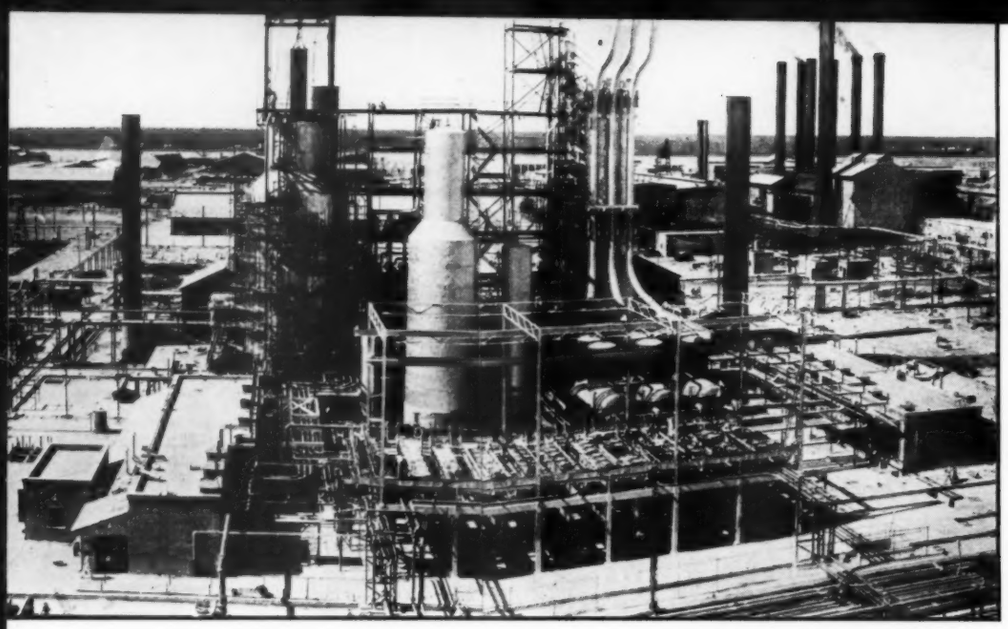
(Continued on Page 72)

VENEZUELA—SUMMARY OF PRODUCTION AND WELLS

	1935		1936*			Well data as of October 1, 1936								
							Producers				Non-producers			
	Total production	Daily average	Total production	Daily average	Total to end of 1936*	Wells drilling	Nat. flow	Gas/air lift	Pumping	Closed in	Inactive	Abandoned	Total wells drilled	Wells completed Jan.-Sept. 1936
Ambrosia	2,013,534	5,517	1,885,340	5,151	31,414,721	..	...	...	78	2	30	15	125	...
La Rosa	15,803,840	43,298	16,693,541	45,611	245,959,505	4	104	67	390	55	227	48	891	22
Benitez	3,852,539	10,555	3,649,733	9,972	16,123,624	..	35	...	2	19	30	5	91	7
Lagunillas	81,127,216	222,266	89,609,757	244,835	676,420,701	7	189	97	467	76	78	24	931	119
Others	.....	.....	55,369	152	82,506	3	4	...	....	15	6	1	26	13
Total Lake fields	102,797,129	281,636	111,893,740	305,721	970,001,057	14	332	164	937	167	371	93	2,064	161
Total 1935 (10 months)	.....	.....	.....	.....	.....	9	278	163	694	156	490	87	1,884	75
La Paz and Concepcion	1,599,434	4,382	1,420,930	3,883	21,979,940	..	5	...	78	...	49	3	135	...
Tarra and Los Manueles	5,131,710	14,060	4,742,206	12,957	42,845,877	..	15	2	13	5	41	15	96	...
Mene Grande	15,510,279	42,494	16,251,209	44,401	173,611,711	2	57	77	4	18	125	19	300	19
El Mene and Media	844,657	2,314	866,555	2,368	22,555,632	1	2	44	50	...	84	134	314	1
Cumarebo	3,021,559	8,278	2,741,933	7,492	16,632,490	..	37	...	1	13	29	13	93	9
Quiriquire	19,874,609	54,451	23,692,253	64,733	73,385,379	5	102	1	24	17	12	17	173	31
Pedernales	45,967	126	122,761	335	187,549	1	3	...	....	...	...	4	7	3
Others	64,060	175	62,982	172	3,262,704	13	1	...	15	39	5	*303	363	7
Total Venezuela	148,889,404	407,916	161,794,569	442,062	1,324,462,339	36	554	288	1,127	259	716	601	3,545	231
Total (10 months) 1935 outside Lake fields	.....	.....	.....	.....	.....	9	180	102	168	130	327	285	1,194	84

*Estimate.

Map of Venezuela and Trinidad Oil Fields



Industry's largest single distillation unit; capacity 65,000 bbls. daily

Size of IRAN

Persia or, to give this country its ancient and its modern name, Iran, had its petroleum refineries in the days when Nebuchadnezzar ruled in Babylon, but "Plus c'est la même chose, plus ça change" is a motto of the petroleum industry, and the demands of the "oil age" have raised Iran's petroleum to the status of that country's chief source of material wealth, while the town of Abadan at the head of the Persian Gulf is at the present, at least, the largest oil port in Asia. Twenty-five years ago there was no Abadan—merely a strip of desert fringed with date palms; now a great refinery with a personnel of nearly 11,000 employes has become the nucleus of the largest township in southwest Iran.

The crude oil which supplies the Abadan refinery and the other refineries of the Anglo-Iranian Oil Co. is drawn from the two great fields of Masjid-i-Suleiman and Haft Kel which lie among the foothills of the Iranian plateau about 130 miles inland from Abadan. Pipe lines across the desert link these fields with Abadan, delivering some 200,000 bbls. of crude oil per day. About 80 per cent of this crude is distilled at Abadan, the remainder being shipped to the company's other refineries in Europe and Australia.

The Iranian oil fields are under a single control and consequently can be operated on strictly scientific principles, thereby insuring the maximum of efficiency and economy in production of the crude oil.

IRANIAN CRUDE OIL

Iranian crude oil is a high quality mixed base petroleum predominantly of the paraffin type containing some 30 per cent gasoline. It has an A.P.I. gravity of 39 and a sulfur content of 1 per cent. As a result of the crude oil's essentially paraffinoid nature, the gasoline is of somewhat low octane rating; the kerosene has excellent illuminating power; the gas oil has an exceptionally high octane value and is consequently a high-grade diesel fuel; while the lubricating oils require rigorous dewaxing but then possess very good viscosity indexes.

The crude oil reaches the surface under high pressure and contains much dissolved gas. This is to a major extent removed at the fields, but a further degassing operation is desirable at the refinery before the oil is shipped in order to minimize evaporation losses and fire risk. This degassing is effected by application of a vacuum, the gas being subsequently compressed for recovery of its gasoline content.

CRUDE OIL DISTILLATION

The total crude oil distillation capacity is approximately 300,000 bbls. per day. All these units are of modern construction consisting of the normal pipe still and fractionating columns, and at least half this capacity is in the form of combined topping and vacuum distilling units, the remainder being straightforward topping units. The latest two additions to the crude oil benches are of interest on account of their unusual size, for they are at present the largest of their class in the world. Each of these units has a normal input capacity of 65,000 bbls. of crude oil per day, and is capable of producing the full range of petroleum products from gasoline to bitumen.

In addition to the crude oil stills there is also some 30,000 bbls. per day of redistillation units for the production of special products, as well as the distillation capacity associated with the cracking section of the refinery.

All distillation units are connected to a comprehensive gas-collecting system which conducts the gas to a central compression and absorption plant. The gasoline recovered from these plants is stabilized, the stable gasoline being blended back with various grades of gasoline distillates as specifications demand. Much of the gas is at present used as fuel, but in the near future several processes will be brought into operation for the conversion of uncondensed gases both from the stills and from the cracking units to stable liquid products of high octane value.

CRACKING EQUIPMENT

From the nature of the crude one could anticipate that the straightrun naphtha would be of low octane rating, while the high-boiling products would possess a high pourpoint due to wax. Cracking treatment is therefore clearly essential for the improvement of both these materials up to the high standards of present day requirements.

NAPHTHA REFORMING UNIT

The equipment at present in use has an input capacity of 90,000 bbls. per day. Part of this plant consists of eight Cross-Kellogg units operating at 300 pounds pressure, partly on naphtha-reforming and partly on cracking a waxy distillate to produce wax-free fuel oil. During 1936 four new naphtha-reforming units each of 15,000 bbls. input operating at 750 pounds pressure and embodying all the most modern improvements for efficiency and flexibility have more than doubled the cracking capacity of the refinery. Each pair of units possesses its own stabilizer, while the five redistillation units for rerunning the cracked spirit after its refining treatment, the absorption plant and other equipment ancillary to the cracking operations are located in this section of the refinery.

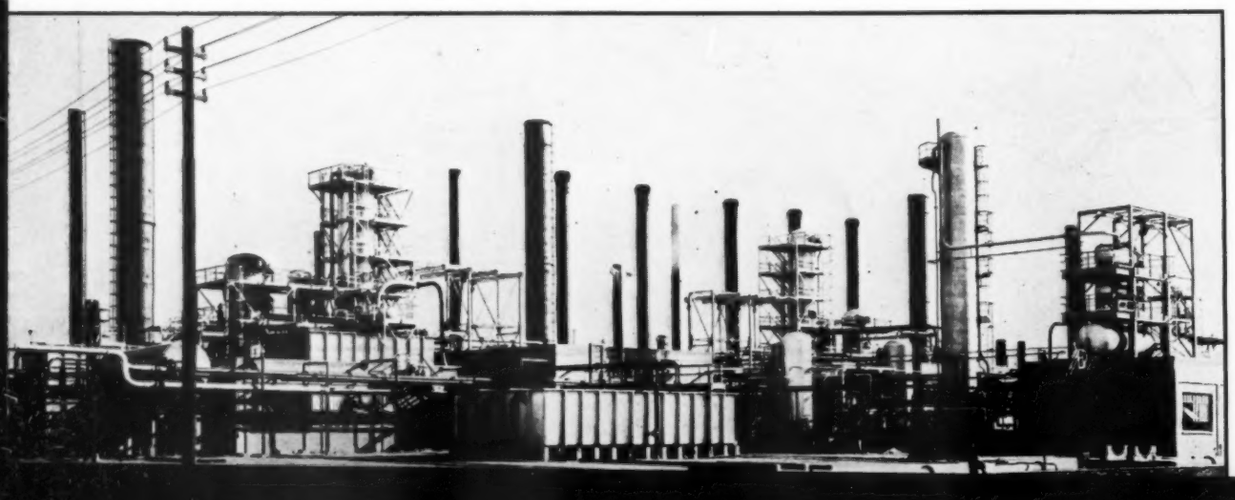
REFINING

The main refinery products consist of various grades of straightrun and cracked gasoline (defined by boiling range, vapor pressure and octane number), kerosene, gas oil, light and heavy residuum fuel oil and blends of distillate with residuum fuel oils to meet certain commercial specifications. A considerable portion of the fuel oil is reserved for use of the British navy, while the production of specially blended aviation gasoline is a matter of steadily increasing importance in view of the developments in air transport, but the staple products are motor gasoline, kerosene, gas oil and bunker fuel oil, the first two of which of course require chemical refining treatment to bring them up to market specifications of quality. It is particularly notable in this connection that the high efficiency in design of the very modern distillation units is reflected not only in superior economy in distillation costs, but in superior purity of the distillates and consequent reduction in the cost of subsequent treatment.

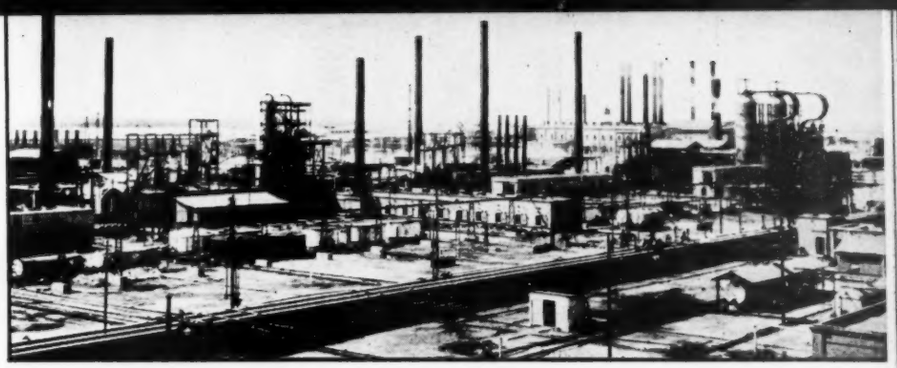
The treatments given depend of course on the type of distillate. Straightrun gasoline is soda-washed immediately to remove hydrogen sulfide, thus preventing the formation of corrosive elemental sulfur by oxidation. Since it contans a small amount of mercaptans it may then be "sweetened" by agitation with sodium plumbite in a continuous washery, the plumbite being regenerated by air-blowing. Desulfurization is not as a rule required, but if necessary it is effected by hypochlorite treatment in a washery of the pressure orifice type, the capacity of which is 30,000 bbls. per day. As has been stated previously, most of the straightrun naphtha is "reformed" by cracking in order to raise the octane value. In order to reduce corrosion of the cracking plant all naphtha to be cracked is given a preliminary soda-wash in an orifice type system.

Cracked spirit is rendered colorless and gum-stable by a very light sulfuric acid treatment carried out in a continuous counter-current plant. The treated spirit is then soda-

Naphtha-reforming unit



Cracking operation



Equipment Feature of Refinery in Iran

washed and redistilled at a low temperature in order to minimize corrosion and to give a distillate with a very low potential gum number. This distillate is finally refined by a soda and hypochlorite treatment.

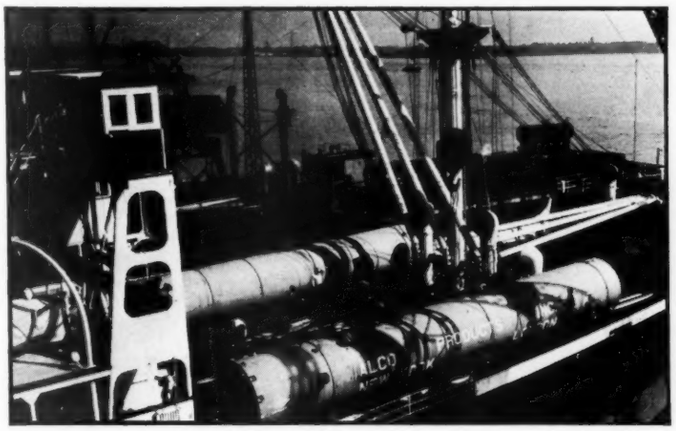
Kerosene is refined by the Edeleanu method with liquid sulfur dioxide, the plant being capable of handling 20,000 bbls. per day. The extract is rich in aromatic hydrocarbons and after fractionation and refining is a valuable source of antiknock material for addition to motor spirit and to tractor vaporizing oil respectively.

Distillate fuel is normally free from hydrogen sulfide and naphthenic acids and consequently requires no treatment, but facilities for soda-washing are available if necessary.

Refining treatments on the scale outlined above require the services of chemical plants of some magnitude for the production of the necessary chemicals. For example, for the manufacture of the sulfuric acid required, two acid plants each capable of producing 30 tons per day of acid have been installed, while the Edeleanu plant is equipped with its own source of SO_2 which is made from sulfur, purified, compressed and stored as liquid for make up and reserve.

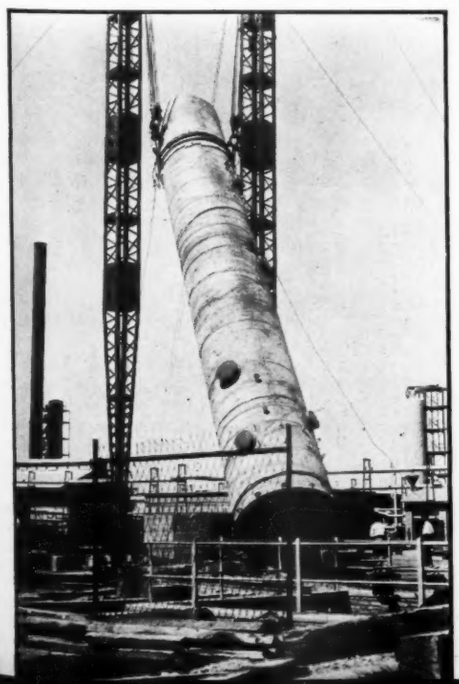
Lime is manufactured from local shell deposits which constitute a very pure form of calcium carbonate, while a 4-ton per day hydrochloric acid plant supplies acid for the treatment of the wells in the oil fields.

There are of course, in addition to the actual refinery, many vital and extensive internal services necessary for the operation of an undertaking of this magnitude; one can only make a passing reference to the 24,000 K.W. power house; the pumping equipment for the circulation of 5,000,000 gallons of water per day; the chemical laboratories which maintain an unceasing control on the operation and output of the refinery units; the extensive engineering work shops responsible for erection and maintenance of all refinery plant and equipment; and the transport department, which handles both surface and air movements of personnel and material.



Loading fractionating towers

Installing mammoth stabilizer column



Other essential components of the establishment include the storage areas, which provide capacity for 2,500,000 tons of crude oil and finished products, as well as some special pressure tanks for storage of butane and natural gasoline, and the jetties where the transport fleet of 10,000-ton tankers load their cargoes of crude oil and refined products for delivery to Europe, Africa and Australia.

The residential area and social amenities have been developed to satisfy the needs of a great and somewhat isolated community, and it may be said briefly that no pains and expenditure have been spared to render Abadan an example of modern industry at its best—to the product of careful planning, the fullest utilization of scientific progress in all its aspects, and the effective coordination of the many sectional activities to a common end.

Danish Oil Demand

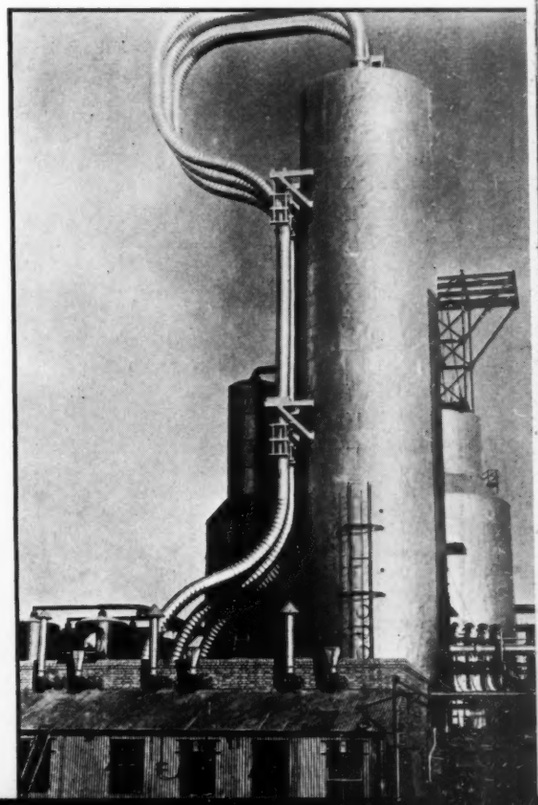
There are few countries in Europe whose oil requirements were affected during the economic crisis to such a small extent as those of Denmark, says Petroleum Press Service. With the exception of minor and temporary setbacks, the curve of total consumption during and since the depression has steadily risen.

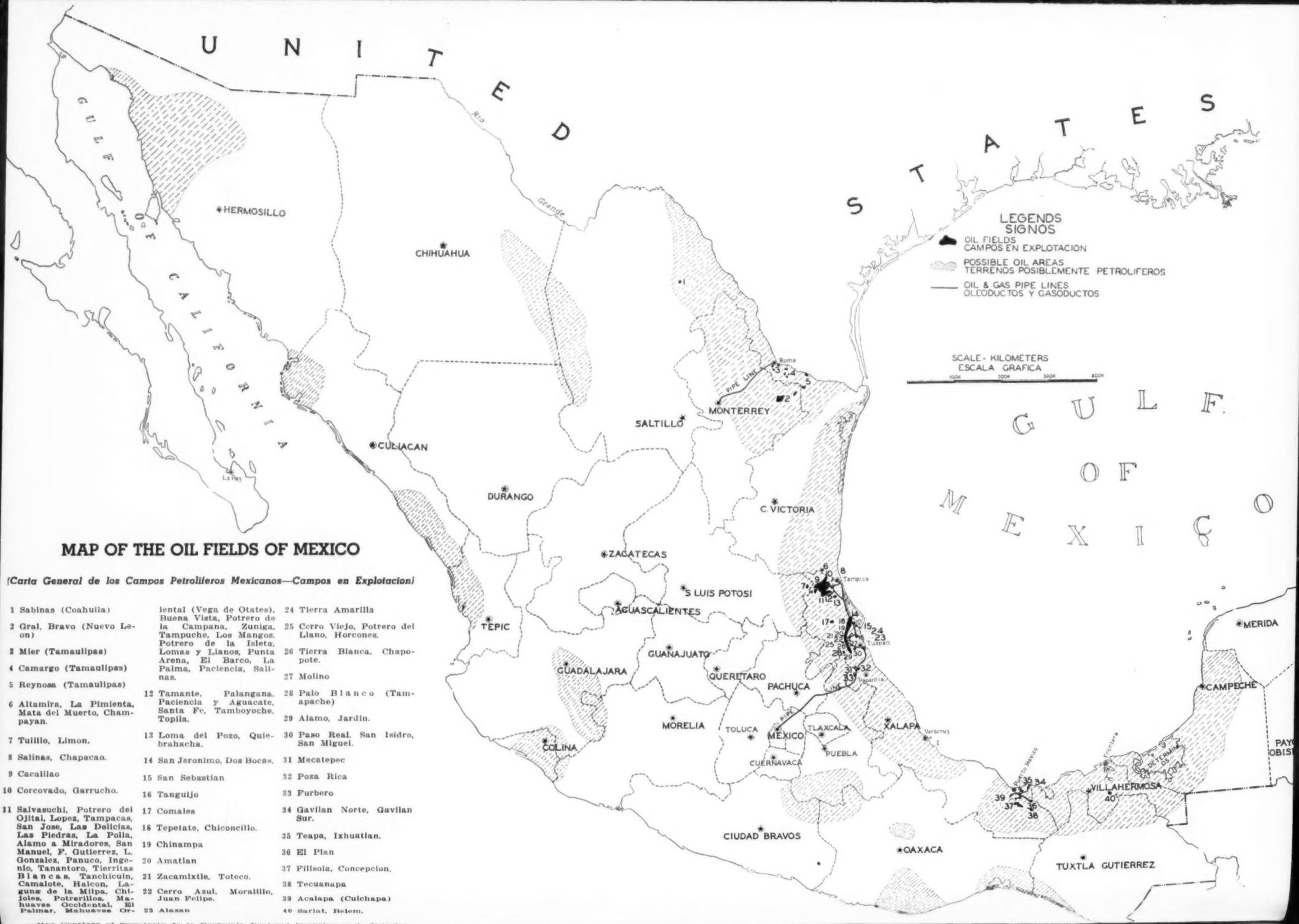
That oil consumption was maintained at a very high level, and tended to rise at the first indications of returning prosperity, is evidence of the firmly established nature of the demand of petroleum products in this country.

During the current year consumption, so far as can be judged from the import figures, has continued to make considerable progress. In the months January-September, 1936, 224,163 tons of gasoline were imported into Denmark (against 189,685 in the similar period of 1935); kerosene imports were 72,822 tons (against 55,243); lubricating oil imports 38,506 tons (against 30,992); and those of dark oils 214,900 tons (against 186,436). These increases are the more remarkable because the country suffered severely from the general strike which lasted for several weeks.

Except for the fact that in 1932, when the value of Danish exports reached its lowest level during the crisis, Denmark's gasoline consumption showed a small decline and kerosene sales also fell back, the steady upward tendency of demand has continued without appreciable interruption. Today the consumption of all products has passed beyond the 1929 level. While sales of gasoline benefited from the relatively free development of motor traffic, the consumption of gas and fuel oil was stimulated by the poverty of the country in coal. Fuel oil has found a ready market for industrial purposes and the diesel engine is favored to an increasing extent owing to the economic advantages it presents over other sources of power. The Danish railways in particular have in recent years steadily followed a policy of replacing steam by diesel traction.

Vacuum distillation





MAP OF THE OIL FIELDS OF MEXICO

(Carta General de los Campos Petrolíferos Mexicanos—Campos en Explotacion)

1 Sabinas (Coahuila)

2 Gral. Bravo (Nuevo Leon)

3 Mier (Tamaulipas)

4 Camargo (Tamaulipas)

5 Reynosa (Tamaulipas)

6 Altamira, La Pimienta, Mata del Muerto, Champayan.

7 Tulillo, Limon.

8 Salinas, Chapacao.

9 Cacalilao

10 Corcovado, Garrucho.

11 Salvasuchi, Potrero del Ojital, Lopez, Tampacas, San Jose, Las Delicias, Las Piedras, La Polla, Alamo a Miradores, San Manuel, F. Gutierrez, L. Gonzalez, Panuco, Ingenio, Tanantoro, Tierritas Blancas, Tanchicuin, Camalote, Halcon, Laguna de la Milpa, Chijoles, Potrerillos, Mahuaves Occidental, El Palmar, Mahuaves Oriental (Vega de Otates), Buena Vista, Potrero de la Campana, Zuniga, Tampuche, Los Mangos, Potrero de la Isleta, Lomas y Llanos, Punta Arena, El Barco, La Palma, Paciencia, Salinas.

12 Tamante, Palangana, Paciencia y Aguacate, Santa Fe, Tamboyoche, Topila.

13 Loma del Pozo, Quiebrahacha.

14 San Jeronimo, Dos Bocas.

15 San Sebastian

16 Tanguijo

17 Comales

18 Tepetate, Chiconcillo.

19 Chinampa

20 Amatlan

21 Zacamixtle, Toteco.

22 Cerro Azul, Moralillo, Juan Felipe.

23 Alazan

24 Tierra Amarilla

25 Cerro Viejo, Potrero del Llano, Horcones.

26 Tierra Blanca, Chapopote.

27 Molino

28 Palo Blanco (Tamapache)

29 Alamo, Jardin.

30 Paso Real, San Isidro, San Miguel.

31 Mecatepec

32 Poza Rica

33 Furbero

34 Gavilan Norte, Gavilan Sur.

35 Teapa, Ixhuatlan.

36 El Plan

37 Filisola, Concepcion.

38 Tecuanapa

39 Acalapa (Cuichapa)

40 Sariat, Belem.

—Map Courtesy of Secretaria de la Economia Nacional Departament de Petroleo

Oil Production in Mexico Remains Fairly Steady

The oil production in Mexico during 1936 remains at a constant level, in spite of certain interruptions in various fields caused by labor difficulties. During the first ten months there was an increase over the corresponding period of 1935, with the probability that the total output for the present year will be approximately equal to that of 1935, if not slightly higher.

Following are comparative figures for five years:

	Crude Oil Production	
	Cubic meters	Barrels
1932	5,215,500	32,805,496
1933	5,405,500	34,000,830
1934	6,068,672	38,171,946
1935	6,397,546	40,240,562
1936 (probable)	6,400,000	40,300,000

The drilling operations were also curtailed due to labor difficulties. There was considerable activity in the Poza Rica field (Papantla district), in the Isthmus and also in the Plan and some other fields where the producing areas were extended. A number of gas wells have been completed on the northeast border of Mexico and in the Camargo (Tams.), General Gravo (N. L.) and Sabinas (Coah.) fields. These wells are in addition to those previously completed and now in production in the region north of Tamaulipas.

The following table shows the drilling operations for the first 10 months of this year in the various oil fields of Mexico:

Field—	No. wells	Initial daily prod.	Av. daily prod. per well
Sabinas (Coah.)	1	gas	....
Gral Bravo (N. L.)	2	gas	....
Mier (Tams)	1	gas	....
Altamira (Tams)	5	1,523	302
Cacalilao (Panuco)	4	490	120
Panuco (Diversos)	5	1,297	258
Poza Rica	5	13,957	2,793
El Burro (Istmo)	1	755	755
El Plan (Istmo)	6	9,108	1,818
Acalapa (Istmo)	2	2,283	1,145
Total	32	29,413	981

Classified by months, these completions were as follows:

	Producing wells	Barrels	Abandoned wells	Completed wells
January	3	2,352	2	5
February	3	1,057	1	4
March	5	3,573	3	8
April	4	9,026	6	10
May	2	1,623	4	6
June	4	5,145	5	9
July	5	3,315	2	7
August	3	158	1	4
September	1	3,145	0	1
October	2	19	2	4
	32	29,413	26	58

The production of refined products for the Mexican market shows a marked increase, as is seen by comparing the figures of the past five years:

	Cubic meters	Barrels
1932	3,805,200	23,934,708
1933	4,671,673	29,384,823
1934	5,934,998	37,331,137
1935	5,703,511	35,875,084
1936 (probable)	6,265,000	39,400,000

Mexican consumption has gradually increased, due to the creation of new industries and the extension of others as well as to the remarkable development of communication by land and by air, particularly the tremendous growth of the highway system and the completion of many miles of roads during the present year, including the last sections of the Mexico-Nuevo Laredo highway formally opened last July.

The increase in Mexican consumption of refined products in the past five years is revealed by the following:

	Cubic Meters	Barrels
1932	2,174,851	13,679,811
1933	2,132,921	13,416,073
1934	2,585,977	16,265,795
1935	2,856,417	17,966,863
1936 (probable)	3,000,000	18,900,000

Considering the improvement of economic conditions in Mexico and the intense activity displayed in the building of highways throughout the country, the gasoline consumption,—as was expected,—keeps on rising at such a rate that the present year will show an increase of more than 15,000,000 gallons over 1935. Here is the development of consumption during the period 1932-1936:

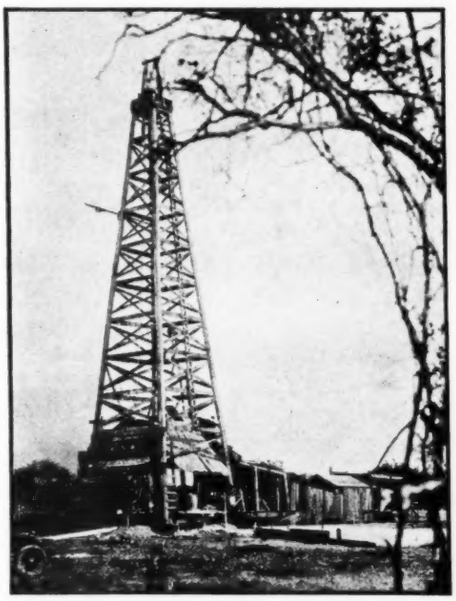
	Litres
1932	269,815,894
1933	260,035,302
1934	313,120,740
1935	354,550,999
1936 (probable)	420,000,000

Litre equals 1.0567 quarts.

An important increase is also witnessed in the export trade, as shown by the following data relative to Mexican export of refined products for the same period:

	Cubic meters	Barrels
1932	3,591,119	22,588,137
1933	3,501,768	22,026,121
1934	3,977,453	25,018,181
1935	3,568,517	22,445,972
1936 (probable)	3,900,000	24,600,000

With the ever increasing demand for oil products everywhere, the economic condition in Mexico, the development of its trade and industry and the betterment of its communications are important factors in favor of the Mexican oil industry; and as 1936 has shown a decided increase in various branches of the industry it is reasonable to assume that the coming year will not be less favorable.



Producing well near Tampico.—(Underwood)

AVERAGE DAILY PRODUCTION FROM MEXICAN OIL FIELDS

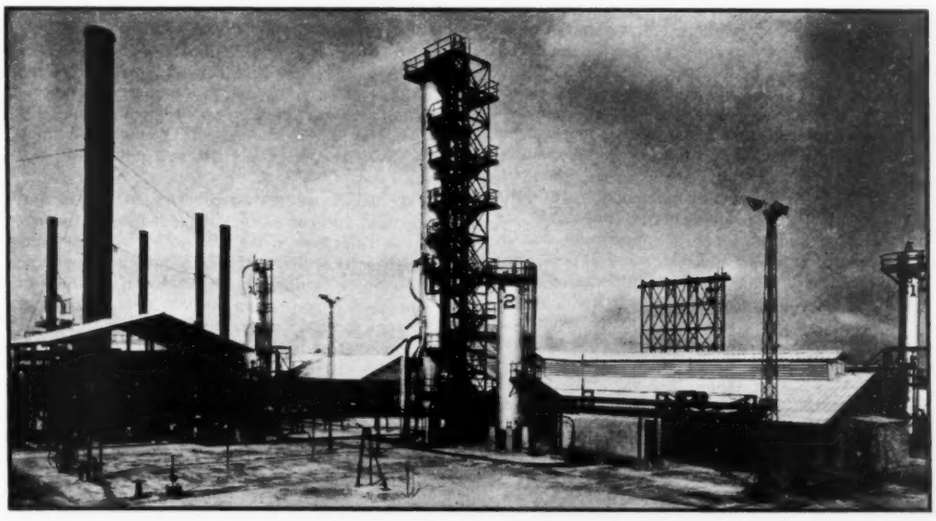
Gas

	Cu. ft.
Sabinas (North Coahuila)	1,765,500
Cral. Bravo (North Nuevo León)	4,978,710
Mier (North Tamaulipas)	10,767,714
Camargo (North Tamaulipas)	40,006,230

Oil

Pánuco and Tamesí River Valley—	Bbls.
Altamira	925
La Pimienta	19
Mata del Muerto	31
Champayán	69
Tulillo	1,415
Limón	774
Salinas	239
Chapacao	7,234
Cacalilao	9,424
Corcovado	805
Garrucho	126
Salvasuchi	642
Potrero del Ojital	245
López	220
Tampacas	69
San José	579

(Continued on Next Page)



4,500-bbl. cracking unit at Tampico

Note: This article and accompanying map were made available through courtesy of The Petroleum Division of the Department of National Economy of the Mexican government.

Huaves Occidental, El Palmar, Mahuaves Oc- 23 Alasan —Mapa Courtesy of Secretaría de la Economía Nacional Departamento de Petróleo 40 Sariat, Helon.

(Continued from Proceeding Page)

	Bbls.
Las Delicias	113
Pánuco and Tamesí River Valley—	
Las Piedras	409
La Polla	25
Alamo a Miradores	195
San Manuel	459
F. Gutiérrez	38
L. González	308
Pánuco	57
Ingenio	195
Tanantoro	465
Tierritas—Blancas	44
Tanchicuin	170
Camalote	101
Hacón	19
Laguna de la Milpa	289
Chijoles	151
Potrerillos	38
Mahuaves Occidental	57
El Palmar	31
Mahuaves Oriental y Vega de Otates	528
Buenavista	283
Potrero de la Campana	113
Zúñiga	13
Tampuche	201
Los Mangos	6
Potrero de la Isleta	327
Lomas y Llanos	94
Punta Arena	13
El Barco	170
La Palma	19
Paciencia	315
Tamante	182
Palangana	195
Paciencia P—Aguacate	296
Loma del Pozo	75
Quiebrahacha	245
Santa Fé	50
Tamboyoche	69
Topila	57
Caracol	182
Pánuco and Tamesí River Valley—	Bbls.
North Tuxpan—	
San Sebastián	57
Faja de Oro—	
San Jerónimo	189
Dos Bocas	69
Tepetate	230
Chiconcillo	201
Chinampa	2,264
Amatlán	6,114
Toteco	3,290
Zacamixtle	315
Cerro Azul	5,950
Moralillo	107
Alazán	547
Cerro Viejo	1,000
Potrero del Llano	598
Horcones	409
Tierra Blanca	5,825
Chapapote	610
Palo Blanco	19
Alamo	536
Jardín	151
Paso Real	1,245
Central Part of Tuxpan—	
Tangüijo	19
Central Tuxpan—	
Tierra Amarilla	107
Tantoyuca, Ver.—	
Comales	6
Papantla y Río Cazones Regió—	
Poza Rica	47,785
Furbero	6
Northeast Part of Isthmus of Tehuantepec—	
Gavilán Norte	6
Gavilán Sur	1,189
El Burro	3,717
Teapa	1
El Plan	16,952
Filisola	2,126
Tecuanapa	13
Acalapa	6

GAS AND OIL PIPE LINES—PRESENT TRUNK LINES

Points Connected—	Length in Meters	Carrying capacity in Cubic Meters per day
S. Pedró de Roma (Tams), to Monterrey (Nuevo León)	155,200 Gas	850,000
Naco (Sonora), to Cananea (Sonora)	61,871 Gas	240,550
Cacalilao (Pánuco, Vera.), to El Barco (Pánuco, Vera.)	26,602	9,750
Corcovado (Pánuco, Vera.), to San Manuel (Pánuco, Vera.)	32,915	1,600
Chapacao (Pánuco, Vera.), to Prieto (Pánuco, Vera.)	48,630	3,840
La Dicha (Pánuco, Vera.), to Mata Redonda (Pueblo Viejo, Vera.)	119,450	14,000
Estación 274 (Pánuco, Vera.), to Estación 75 (Pánuco, Vera.)	8,935	6,000
Tepetate (Tantima, Vera.), to Prieto (Pánuco, Vera.)	100,500	8,200
Tierra Blanca (Temapache, Vera.) to Mata Redonda (Pueblo Viejo, Vera.)	159,125	31,797
Naranjos (Amatlán, Vera.), to Chijol (Tampico Alto, Vera.)	107,550	9,540
Naranjos (Amatlán, Vera.), to Tuxpan Asunción, Vera.)	85,600	7,950
Poza Rica (Coatzintla, Vera.), to Tuxpan (Asunción, Vera.)	62,320	2,814
Cobos (Santiago de la Peña, Vera.), to Furbero (Coatzintla, Vera.)	88,950	1,270
Alamo (Temapache, Vera.) to K 33 Pipeline "El Aguila", (Temapache, Vera.)	40,469	5,500
Palma Sola (Coatzintla, Vera.), to Atzcapotzalco (D. F.)	223,615	1,749
Tonalá (Puerto México, Vera.), to Minatitlán, (Minatitlán, Vera.)	59,698	3,700
Tonalá (Puerto México, Vera.) to Minatitlán, (Minatitlán, Vera.)	56,585 Gas	302,434
El Plán (Minatitlán, Vera), to El Chapo (Ixhuatlán, Vera.)	34,778	4,173
El Plán (Minatitlán, Vera.), to El Chapo (Ixhuatlán, Vera.)	34,200 Gas	170,000

PRESENT REFINERIES IN MEXICO

Companies—	Location—	Capacity in bbls. per day
Cía. Mex. de Petróleo "El Aguila," S. A.	Dona Cecilia, Tamps.	30,000
Cía. Mex. de Petróleo "El Aguila," S. A.	Minatitlán, Ver.	31,000
Cía. Mex. de Petróleo "El Aguila," S. A.	Atzcapotzalco, Méx., D. F.	7,500
Huasteca Petroleum Co.	Pueblo Viejo, Veracruz	20,000
Pierce Oil Co.	Arbol Grande, Tamps.	11,000
Teodoro Meza Moreno	Paciencia y Aguacate, Ver.	300
Petróleos de México, S. A.	Bella Vista, Pueblo Viejo, Ver.	2,000
J. Cavazos y E. Reséndez	Nuevo Laredo, Tamps.	100
Donaciano Echeverría	Nuevo Laredo, Tamps.	300
Mateo González e Ignacio Martínes García	Santa Catarina, Nuevo León.	200

WORLD PRODUCTION

(Continued from Page 41)

ments throughout Europe to hamper the oil industry and burden the consumer in their countries with increasing taxation and restrictions. In great part this is due to the general feeling of unrest which prevails today throughout the Continent, under which governments of non-producing countries have yielded to popular clamor and are attempting to achieve a feeling of national security by becoming, or trying to become, as far as possible independent of imported oils. This leads to a tendency to foster, regardless of cost, the manufacture and use of home-produced motor fuels including various types of substitutes for gasoline to which preferential tariffs are extended and with which the oil importer has to compete. In some cases the industry is compelled to maintain stocks over and above normal trading requirements, involving loss of interest and increased expenditure for extra storage, while the governments of some consuming countries, in which no appreciable quantities of crude oil exist, have gone out of their way to encourage or even compel the erection of local refineries. This policy has involved the expenditure of large sums of money on the quite unnecessary duplication of refining facilities which are already in existence elsewhere.

The cumulative effect of such measures, combined with the very high rate of taxation with which oil is burdened, in most countries, is the inevitable increase in the cost of oil products to the consumer and a consequent decrease in potential consumption. It is, perhaps, not universally realized that high rates of taxation involve extra labor costs and additional working capital: accordingly, the cost of the product is increased by more than the actual amount of the tax imposed and although there are various other national and economic factors which influence the consuming capacity of the population of any country, nevertheless it is usually the case that consumption per capita varies in inverse ratio to the rate of taxation.

It is, therefore, a question now of some importance to the oil industry whether this striving on the part of so many non-producing countries towards oil self-sufficiency can be maintained, or whether the quite uneconomic foundation upon which any such policy is built will not in the end cause its downfall.

In Germany, where the government has formulated a plan for complete independence of foreign imports within four years, the policy is being pursued with a total disregard of economic considerations. Heavy subsidization of crude oil production has increased output from 230,000 tons in 1932 to 430,000 tons in 1935, and this with increased manufacture of synthetic gasoline, benzol and motor alcohol has been responsible for a remarkable increase in home-produced motor fuel, as is clear from the following figures of production for the past three years:

	Gasoline	Benzol	Alcohol	Total
1934	250,000	280,000	170,000	700,000
1935	365,000	380,000	180,000	925,000
1936 (Estimated)	575,000	425,000	200,000	1,200,000

The cost of these efforts to achieve self-sufficiency is clear from the fact that in 1935 the German government sacrificed in import duties on gasoline alone a revenue of some 190 million Reichsmarks while, if the cost of compulsory alcohol is included, the total extra burden attributable to this policy was about 330 million Reichsmarks.

The amount to which this burden must rise if and when complete independence of imports is attained can be realized in view of the fact that Germany's consumption of motor spirit alone, not to mention other oil products, is over two million tons per annum.

In most countries in Europe today there prevail to a greater or less extent this tendency to restrict as far as possible the use of imported products in favor of home-produced by means of tax rebates to home-produced or locally refined oils and by assistance given in the form of state subsidies and loans to encourage the manufacture of synthetic substitutes.

The natural result is that, apart from the immense sums lost to the government, in potential import duties, the consumer is compelled to pay for his oil, prices far in excess of what he would pay for an imported straight product, which inevitably tends, if not actually to lower consumption, at any rate to slow down any increase in consumers' requirements.

In France, for example, motor fuel consumption has remained practically stationary for several years, largely as a result of heavy taxes on the consumer which, though partly imposed for fiscal reasons, were also in fact due to the enforced admixture of home-produced alcohol and, in spite of this, the government now shows signs of fostering the production of expensive synthetic oil from coal. The consequence of such a policy can only be to increase still further the price of motor fuel and to restrict its consumption still further.

Deterding Aids Farmers

Sir Henri Deterding has placed approximately $5,400,000 at the disposal of Dutch farmers to lessen their distress and facilitate export of agricultural produce to Germany.

Greenstuffs, fruit and cattle which Dutch farmers have been unable to sell will be bought by an organization made up by Sir Henri, which will pay the farmers in guilders and the produce will be bought by Germany, which will pay the organization in marks.

California Standard Tankers

Standard Oil Co. of California has contracted with Sun Shipbuilding & Dry Dock Co., of Chester, Pa., for construction of two 12,900-ton steam turbine propelled tankships. These vessels, which will be sister ships, will have capacity of more than 100,000 bbls. of oil each.

Deep Rock Decision

A reorganization of Deep Rock Oil Corp., to be operated under the supervision of the court for five years, was approved in Tulsa last week by Federal Judge Franklin E. Kennamer, who said he might extend or shorten the period of supervision, depending on progress made in settling obligations of the firm, which has been in receivership nearly four years.

Cosden Reorganization

FORT WORTH, Tex.—Simultaneously with presentation of a plan for reorganization by Cosden Oil Co. under section 77B of the national bankruptcy act, Federal Judge James Wilson set January 22 for a general hearing on all plans of reorganization.

Magnetic Storm

Tucson, Ariz., observatory of the U. S. Coast and Geodetic Survey report a moderate magnetic storm began at 5 p.m. (C.S.T.) December 27 and ended at 6 p.m. (C.S.T.) December 28. Telegram follows:

"Moderate storm began twenty-seventh. Seventeen. Ended twenty-eighth. Eighteen. Central Time."

Importance of Roumanian Industry Still Growing

By PERCY R. CLARK

Some claim that the year 1936 has been a year of artificial prosperity for Roumania. There may perhaps be a substratum of truth in this, based on the fact that the local industry has been protected (and hampered) by artificial barriers, such as severe import regulations and remittance restrictions. Nevertheless, it has to be admitted that the petroleum industry, at any rate, has passed through a year of progressive activity.

Roumania occupies with each succeeding year a more prominent position among the petroleum countries of the world. In 1935 of the total world production of 225,000,000 tons, Roumania was responsible for about 8,500,000 tons, or say, 3¾ per cent, while it would appear that this percentage will be slightly increased for the year 1936.

As shown in the accompanying table the production of some of the leading concerns in Roumania for the first nine months of the present year, divided over the different provinces. The total oil production of Roumania for this period is 6,601,389 tons.

It is particularly noticeable that Roumania has been coming more and more to the front in the matter of technical development and efficient production methods during the last few years.

The petroleum industry of Roumania can no longer be regarded as primitive and unorganized. For some years now such world oil concerns as the Standard Oil Co. of New Jersey and Royal Dutch-Shell, have been working fundamentally and intensively trying out on this soil the most successful developments of the world's oil fields, while the more exclusively native concerns such as Creditual Minier and Steaua Romana make a regular practice of sending picked engineers to gain experience and gather ideas from the leading oil fields of the world, mainly of course from the United States.

DRILLING METHODS

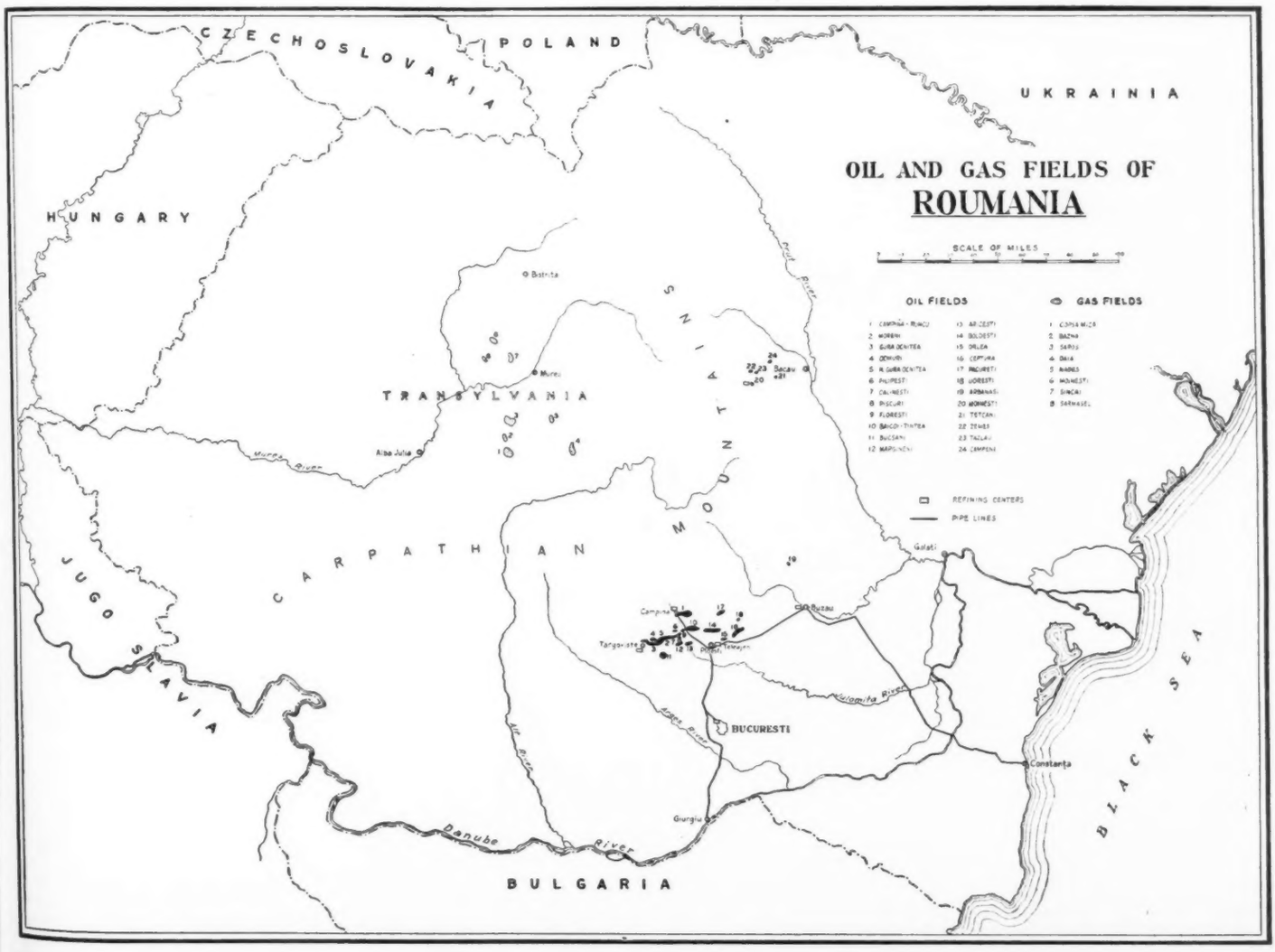
Drilling methods are being continually improved. Wells go down 6,000 to 7,000 feet in less than a month, while even the deepest well in Europe, at Chituran, reached some 11,000 feet in 4½ months.

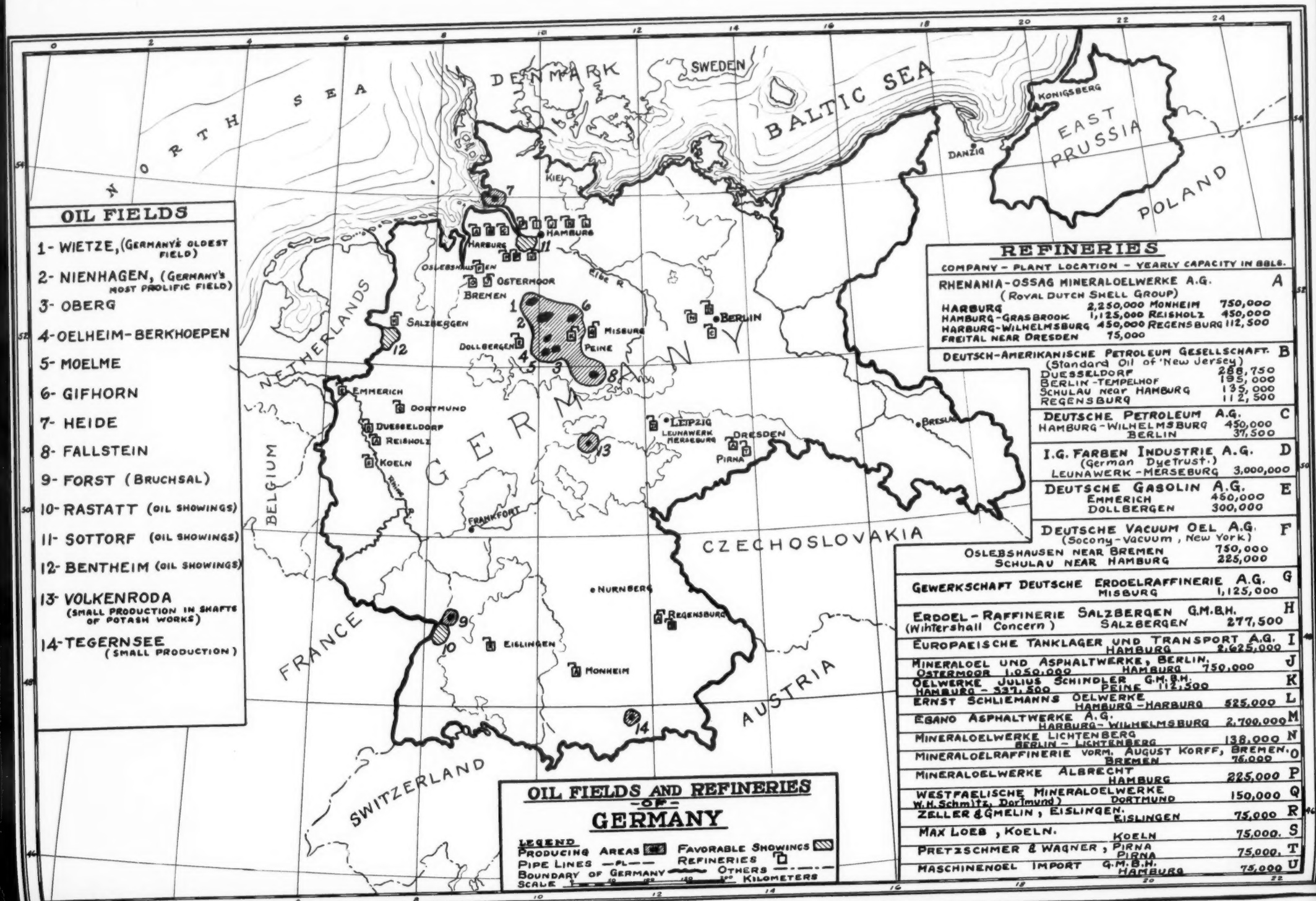
Similarly, production methods have been considerably improved. No longer do the oil fields represent a mess of crude oil lying about everywhere. Nowadays oil does not see the light of day except in the form of refined products.

As regards future prospects here, one prominent geologist has stated that the quantity of undeveloped petroleum land in Roumania is a "misfortune." It is estimated by the Roumanian geologists that there are probably still some 80,000 to 100,000 acres of oil-bearing land to be explored. Let that be as it may, fresh petroleum regions are being continually opened up. It cannot be denied that the methods of prospecting and working can rival those of any country in the world, and, as regards the refining and marketing of production, the last two years have shown marked advances.

One may say that the most noteworthy feature in the development of the Roumanian Petroleum Industry during the present year has been the

(Continued on Page 78)




OIL FIELDS
1- WIETZE, (GERMANY'S OLDEST FIELD)
2- NIENHAGEN, (GERMANY'S MOST PROLIFIC FIELD)
3- OBERG
4- OELHEIM-BERKHOEPEN
5- MOELME
6- GIFHORN
7- HEIDE
8- FALLSTEIN
9- FORST (BRUCHSAL)
10- RASTATT (OIL SHOWINGS)
11- SOTTORF (OIL SHOWINGS)
12- BENTHEIM (OIL SHOWINGS)
13- VOLKENRODA (SMALL PRODUCTION IN SHAFTS OF POTASH WORKS)
14- TEGERNSEE (SMALL PRODUCTION)
REFINERIES
COMPANY - PLANT LOCATION - YEARLY CAPACITY IN BBLS.
A RHENANIA-OSSAG MINERALOELWERKE A.G. (ROYAL DUTCH SHELL GROUP)
HARBURG 2,250,000 MONHEIM 750,000
HAMBURG-GRASBROOK 1,125,000 REISHOLZ 450,000
HARBURG-WILHELMSBURG 450,000 REGENSBURG 112,500
FREITAL NEAR DRESDEN 75,000
B DEUTSCH-AMERIKANISCHE PETROLEUM GESELLSCHAFT. (STANDARD OIL OF NEW JERSEY)
DUESSELDORF 288,750
BERLIN-TEMPELHOF 195,000
SCHULAU NEAR HAMBURG 135,000
REGENSBURG 112,500
C DEUTSCHE PETROLEUM A.G.
HAMBURG-WILHELMSBURG 450,000
BERLIN 37,500
D I.G. FARBEN INDUSTRIE A.G. (GERMAN DYETRUST.)
LEUNAWERK-MERSEBURG 3,000,000
E DEUTSCHE GASOLIN A.G.
EMMERICH 450,000
DOLLBERGEN 300,000
F DEUTSCHE VACUUM OEL A.G. (SOCONY-VACUUM, NEW YORK)
OSLEBSHAUSEN NEAR BREMEN 750,000
SCHULAU NEAR HAMBURG 225,000
G GEWERKSCHAFT DEUTSCHE ERDOELRAFFINERIE A.G.
MISBURG 1,125,000
H ERDOEL-RAFFINERIE SALZBERGEN G.M.B.H. (WINTERSHALL CONCERN) SALZBERGEN 277,500
I EUROPAEISCHE TANKLAGER UND TRANSPORT A.G. HAMBURG 2,625,000
J MINERALOEL UND ASPHALTWERKE, BERLIN. OSTERMOOR 1,050,000 HAMBURG 750,000
K OELWERKE JULIUS SCHINDLER G.M.B.H. HAMBURG-337,500 PEINE 112,500
L ERNST SCHLIEMANNS OELWERKE HAMBURG-HARBURG 525,000
M EGANO ASPHALTWERKE A.G. HARBURG-WILHELMSBURG 2,700,000
N MINERALOELWERKE LICHTENBERG BERLIN-LICHTENBERG 138,000
O MINERALOELRAFFINERIE VORM. AUGUST KORFF, BREMEN. BREMEN 76,000
P MINERALOELWERKE ALBRECHT HAMBURG 225,000
Q WESTFAELISCHE MINERALOELWERKE W.H. SCHMITZ, DORTMUND) DORTMUND 150,000
R ZELLER & GMELIN, EISLINGEN. EISLINGEN 75,000
S MAX LOEB, KOELN. KOELN 75,000.
T PRETZSCHMER & WAGNER, PIRNA PIRNA 75,000.
U MASCHINENOEL IMPORT G.M.B.H. HAMBURG 75,000
OIL FIELDS AND REFINERIES -OF- GERMANY
LEGEND
PRODUCING AREAS
FAVORABLE SHOWINGS
PIPE LINES —PL—
REFINERIES
BOUNDARY OF GERMANY
OTHERS
SCALE
KILOMETERS
NORTH SEA
DENMARK
SWEDEN
BALTIC SEA
KONIGSBERG
EAST PRUSSIA
DANZIG
POLAND
KIEL
HAMBURG
HARBURG
OSLEBSHAUSEN
OSTERMOOR
BREMEN
ELBE R.
MISBURG
PEINE
BERLIN
SALZBERGEN
DOLLBERGEN
NETHERLANDS
EMMERICH
DORTMUND
DUESSELDORF
REISHOLZ
KOELN
RHINE R.
BELGIUM
GERMANY
LEIPZIG
LEUNAWERK MERSEBURG
DRESDEN
PIRNA
BRESLAU
FRANKFORT
CZECHOSLOVAKIA
NURNBERG
REGENSBURG
EISLINGEN
MONHEIM
FRANCE
AUSTRIA
SWITZERLAND

Germany Imports 65 Per Cent of Its Motor Fuel Needs

By CARL H. EHLERS

In 1929 British petroleum experts investigated the oil possibilities of the northwestern German plain and a British petroleum periodical said: "An extensive tour of the whole of Germany's oil fields last week tempts us to place on record our considered opinion that in the not distant future Germany will be one of the most important oil-producing countries on the European continent. The pity is that her vast oil wealth has been allowed to remain dormant so long."

In the light of this optimistic comment the accompanying table of production figures since 1894 is of interest, showing as it does, the development of Germany's crude oil industry since its inception, and affording a clue to its ultimate potentialities. The figures do not include the Alsatian output, which was lost through the terms of the Treaty of Versailles.

PRODUCTION

Year	Bbls.	Year	Bbls.
1894	12,000	1915	419,422
1895	12,090	1916	384,337
1896	11,340	1917	327,165
1897	19,500	1918	285,217
1898	19,087	1919	280,147
1899	25,537	1920	262,837
1900	207,982	1921	287,917
1901	180,735	1922	314,962
1902	221,400	1923	380,775
1903	312,997	1924	445,140
1904	507,030	1925	593,625
1905	433,057	1926	715,252
1906	444,952	1927	726,622
1907	602,887	1928	690,022
1908	848,775	1929	778,485
1909	853,665	1930	1,271,940
1910	832,470	1931	1,713,870
1911	739,830	1932	1,723,882
1912	655,822	1933	1,788,772
1913	533,835	1934	2,361,390
1914	458,505	1935	3,150,000

During the first 10 months of 1936 the output remained stable, as indicated by the following figures: January, 272,670 bbls.; February, 243,690; March, 293,993; April, 264,127; May, 262,020; June, 274,943; July, 292,185; August, 276,277; September, 273,810; October, 296,955. Total, 2,750,670 bbls.

Production of the Nienhagen field, the principal one, was curtailed for lack of proper refining facilities. It is said Nienhagen could easily produce 400,000 bbls. per year more than is withdrawn at present. The value of the total production in 1935 of 3,150,000 bbls. amounted to approximately $15,600,000.

The unbiased observer will conclude that it will be a lifetime before the oil industry of Germany can be a factor of importance among the petroleum-producing countries in Europe, let alone the United States and other countries of the western hemisphere.

The disparity between Germany's consumption and production is made up by imports and the manufacture of synthetic products. Germany in 1934 imported 22,000,000 bbls. of petroleum products, and in 1935 about 26,000,000 bbls. For the first six months of 1936 shipments from foreign sources totaled 13,600,000 bbls., indicating a further increase for the full year. So far, Germany's own output of crude represents only 10 per cent of her total consumption. Consumption of petroleum products of all kinds has increased subsequently during the last three years of the Hitler regime.

Germany is motorizing fast. In 1933 the automobile tax was abolished. The effect was a large increase in automobile production. In 1932 only 45,000 cars were built, but 1936 production figures will reach more than a quarter of a million. The number of automobiles operated in Germany has doubled since 1932. The Adam Opel Works in Ruesselsheim (subsidiary of General Motors Export Corp. of New York) during the first nine months of 1936 manufactured 100,000 automobiles. The total production of the Adam Opel Works since its inception amounts to approximately 600,000 cars. It took the works not less than 30 years to complete the first lot of 100,000 cars and now this same output is accomplished in nine months. Selling prices for all cars have been lowered.

Germany has just completed construction of the first 1,000 kilometers of automobile highways. In all, about 7,000 kilometers of such modern highways will be built, which will speed up motorization of traffic with the result that consumption of petroleum products will increase substantially. How is Germany going to supply this ever increasing demand in the face of her limited domestic output of crude, her small holdings of foreign exchange and gold and the still disrupted trade relations between many nations? At present, she is paying for her imported petroleum products mainly through barter arrangements. Her large imports of oil from Rumania are a case in point. Steadily increasing quantities of gasoline are imported from Rumania against shipment of manufactured goods. Rumania has outranked the United States as principal shipper of petroleum products to Germany. There is no guarantee, however, of the permanency of such barter deals, while Germany's proverbial hunger for oil is growing daily.

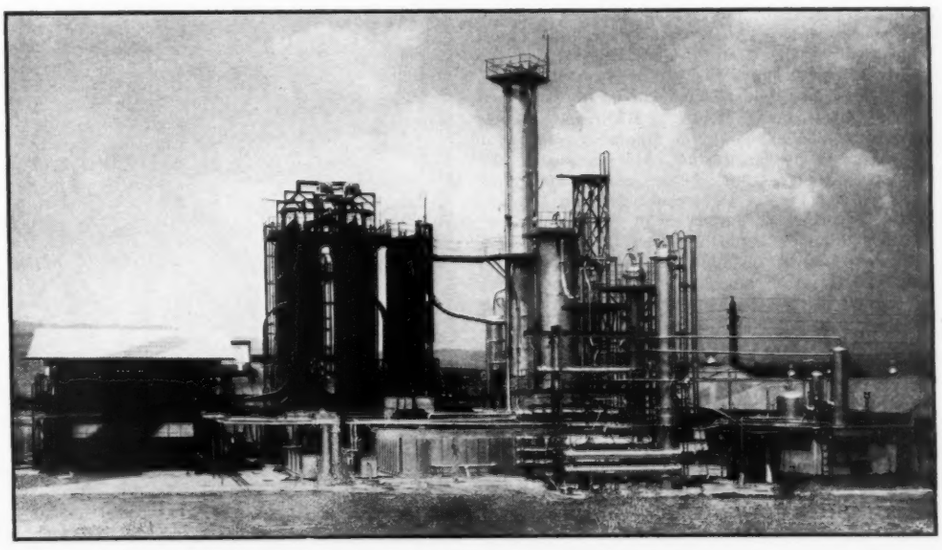
This situation is recognized by Germany's economic leaders. The "four-year plan," if successful, will mean for Germany some sort of autarchy or self-sufficiency. The German chancellor recently remarked that the automobile roads were being built for all eternity for the German people, whom he pictured motoring as freely as the people of the United States. He asserted that in 18 months Germany no longer would be compelled to import gasoline. If this prediction is taken at its face value, one must conclude that Germany is bent on developing her industries for the manufacture of synthetic products and substitutes, to satisfy her increasing demand regardless of the lower cost of products derived from the crude, which she probably is not capable of producing in sufficient quantities.

Poor as Germany is with respect to her known resources of crude oil, she is rich in her huge reserves of coal. According to conservative estimates, Germany has a coal reserve of more than 60 billion tons. Her yearly consumption is approximately 150 million tons, which, it is said, will be increased by only one million tons more, in order to obtain the basic material for the manufacture of light motor fuels. In addition, three million tons of lignite, which Germany also possesses in abundance, is used annually for conversion into motor fuels.

There are already in Germany highly developed industrial plants in operation or in the process of completion for the utilization of the energy which is dormant in the coal. The German coal and chemical industries for several years have occupied themselves with the scientific task of liquefaction of the coal. There are two major processes capable of producing substantial quantities of light motor fuels at a cost not much higher than that of gasoline derived from crude oil. The best-known process is that of the German Dyetrust (I. G. Farben Industrie A. G.) and the other major process of high scientific and commercial importance is that perfected by Franz Fischer and Tropsch. There are other synthetic processes and it is believed that a substantial portion of Germany's light motor fuel requirements will be manufactured soon from the coal. It is said that the German Dyetrust has now a capacity of producing 3,000,000 bbls. of synthetic gasoline annually. This gasoline is sold at the German tank stations under the name of "leuna-benzin."

To fulfill the German chancellor's prediction that Germany in 18 months will be free from the compulsory importation of gasoline, she must make enormous strides in the manufacture of synthetic products, in view of the fact that today she is still forced to import about 65 per cent of her total consumption, which for the current year will exceed 30,000,000 bbls. In 1934 it was 26,800,000 bbls., and in 1935 it was 29,700,000 bbls.

The gasoline consumption per capita is only one-third to one-fifth of that in other European countries of similar standards of living. With her greatly accelerated industrial pace and business activities there is every reason to believe that the consumption of oil products will increase giving impetus to her policy of self-sufficiency to be



Cracking unit with continuous coking: Czechoslovakia

attained by further development of synthetic methods of production and by geophysical investigation and systematic drilling operations to determine whether Germany really possesses oil-bearing regions, capable of yielding for many years to come an output much larger than the present one. Motorization apparently has only begun in Germany. The following gasoline consumption figures per capita are of interest: Germany, 10 gallons; France, 21; England, 36; United States, 152.

In addition to Germany's efforts to manufacture sufficient quantities of light motor fuels through synthetic methods, the German government has adopted a policy of subsidizing its oil industry with a view of opening new fields. Nine have been discovered so far. The government advances 50 per cent of the drilling costs to the operator of a well to be drilled on the basis of pure speculation. If the well comes in as a producer in commercial quantities, the oil company is obligated to repay the amount advanced plus interest. If the test is a dry hole, the government has no claim. In addition to these drilling subsidies, the government is said to have set aside a fund of approximately 2,000,000 reichmarks for geophysical surveys. General Goering recently declared in connection with the four-year plan that, so far, only 10 per cent of Germany's subsurface soil has been investigated by geophysical methods and that the government is bent on doing everything in its power to obtain a definite answer with respect to Germany's possible underground treasures. Three years ago, when the government's drilling program was inaugurated, her geologists were not particularly optimistic. They realized that Germany is not essentially an oil country. They were elated when the government's drilling program in 1935 resulted in the discovery of five new oil-bearing regions far from the four older fields. So far in 1936 no new fields have been found. The five new fields are Heide, in Holstein; Gifhorn and Moelme, in Hanover; Fallstein, near Halberstadt; Forst in Baden. With the exception of the Fallstein well, which is producing at a depth of 4,500 feet, shallow production was found ranging from 900 to 2,400 feet. Many geologists had expressed the opinion that really paying production could be obtained only at great depth. Efforts again are being concentrated to obtain production from shallow horizons. The following table shows results obtained in Germany during the last three years:

	Wells drilled	Producers	Dry holes
1933	97	48	49
1934	156	62	94
1935	121	59	62

The oil production for 1936 will probably be in the neighborhood of that of 1935. The four principal German producers are as follows:

	1935 Output (bbls.)	Producing fields
Gewerkschaft Elwerath	1,625,000	Nienhagen, Moelme
Wintershall Potash Concern	637,500	Nienhagen
Deutsche Petroleum A.G.	450,000	Wietze, Nienhagen, Gifhorn, Helde
Deutsche Vacuum Oel A.G.	309,000	Oberg, Nienhagen

The principal producing field, Nienhagen, 28 kilometers north of the city of Hanover, is yielding approximately 76 per cent of the total of all nine fields. The Gewerkschaft Elwerath is the most successful operating company in this area, producing more than 50 per cent of the combined annual output of all fields. With a price of approximately $5 a barrel, the financial results for the company are gratifying. Its net income for 1935 permitted the distribution of a dividend of $960 per share. The Deutsche Petroleum A.G. obtains its principal output from the old Wietze field, 30 kilometers northwest of Hanover, which is famous for its "oil mine," in which the oil sand is mined through gallery operations. The output of the Wietz field has declined somewhat during the last few years. It is reported that mining operations are to be extended.

The Deutsche Vacuum Oel A.G., wholly owned subsidiary of the Socony-Vacuum Oil Co., New York, obtains its principal production from the Oberg field, 30 kilometers southeast of Hanover. Deutsche Vacuum controls about 90 per cent of the total production in this field, which still has great possibilities. The oil-bearing strata at Oberg are the Wealden and the Dogger (Middle Jurassic). The wells in the Oberg field are of shallow depth (450-750 feet) and their initial production is 70 to 150 bbls. daily. A few months ago a well came in with the unusually high initial production rate of 600 bbls. a day.

The old Oelheim-Berkhoepen field, owned by the Preussische Bergwerks & Huetten A.G. seems to have lost the importance it had a few years ago. No new drilling operations have been reported in this field during the current year.

With respect to the five new discoveries (Heide, Gifhorn, Moelme, Forst, Fallstein), there is no definite information as to the outcome of additional drilling operations during the current year. Separate production figures for these fields are not published, but it is reported that the output is holding up well. Whether these five new discoveries can be developed into fields of real importance remains to be seen.

OLDENBURG

West of the city of Bremen lies the former federal state of Oldenburg. This territory comprises approximately 1,300,000 acres. In 1929 the North European Oil Corp. (Delaware) obtained a governmental concession for the exploitation of oil in this huge area. North European subsequently transferred half of the area to the Deutsche Vacuum Oel A.G. and half to the Royal Dutch Shell group. These two companies recently pooled their interests for joint exploration of the concession, and according to reports, these two major companies soon will start the drilling of a well in the southern part of the concession area, the outcome of which is awaited with interest. During the summer of 1936 Deutsche Vacuum and the Royal Dutch Shell interests completed a seismic survey of a substantial portion of Oldenburg, the result of which indicated the presence of a promising structure.

There are about 570 oil companies registered in Germany of which only 28 companies are active and producing in commercial quantities. The rest are apparently owners of oil and gas leases, lacking sufficient funds to undertake drilling operations.

Germany at present operates 35 refineries, of which Ebano Asphalt A.G. in Harburg and the Rhenania-Ossag in Harburg are the largest. The total capacity of these 35 refineries is in excess of 20,000,000 bbls. a year. Some of them are being enlarged, while new refining plants are being built, chiefly for the manufacture of high-grade lubricants from German crude. There is apparently a tendency to conserve the domestic crude for the manufacture of lubricants, while light motor fuels are manufactured synthetically or from crude oil imported from abroad. The principal refineries and their yearly capacity are shown in accompanying map.

The question whether Germany really possesses petroleum deposits of importance cannot be answered yet. The fact remains that under government auspices, systematic efforts are being made to bring about a clarification of this problem. It will be worthwhile to watch the concerted efforts on the one hand to locate new fields and on the other to build new plants for the large-scale manufacture of light motor fuels through synthetic methods and processes with a view to render Germany independent of the compulsory importation of gasoline and other oil products.

Germany would like to continue to purchase her large oil requirements from foreign countries through the regular channels of commerce, but she is handicapped by conditions, in which international trade relations are still chaotic, with a one-sided distribution of the world's gold supply, numerous trade restrictions, often dictated by political expediency, and war fears widely felt.

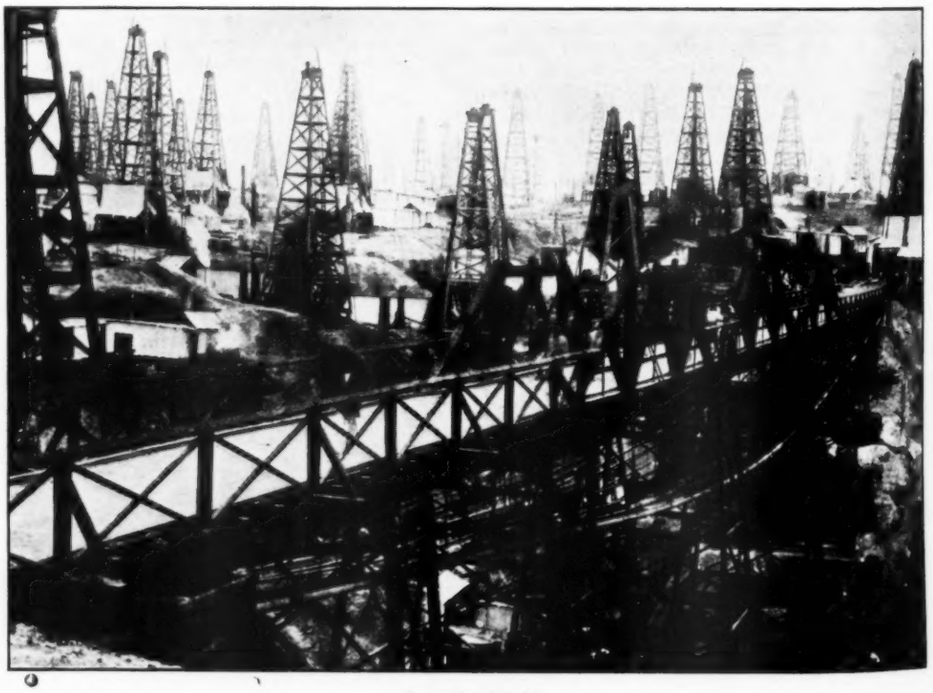
Last month the Deutsche Gesellschaft fuer Mineraloelforschung (Association for Petroleum Research) met to discuss the problem of supplying the country with the necessary petroleum products through domestic production. The scientists present promised to fulfill the task placed before them. Their considered opinion was that the practical application of the existing inventions to large-scale manufacture of synthetic motor fuels will ultimately win out and the belief was expressed that if the world should be confronted with a shortage of crude oil, the synthetic processes will prove a boon not only to Germany, but to the entire world.

Oil in British Colonies

An important change has been announced by the British government, the London Petroleum Times says, with regard to development of oil lands within the empire, which has been open only to British subjects or British-controlled companies.

Concessions are to be granted or assigned to foreigners or foreign-controlled companies where foreigners are citizens of countries granting similar advantages to British. Concession to be made to a company registered in British territory. Majority of employes and some directors, and chief local representative, to be British.

As soon as output reaches a specified amount, 50 per cent to be refined on British territory, and the plant to be capable of producing fuel oil for admiralty use. The government to retain the right of preemption in emergency. The concession must be worked.



Burmah oil field

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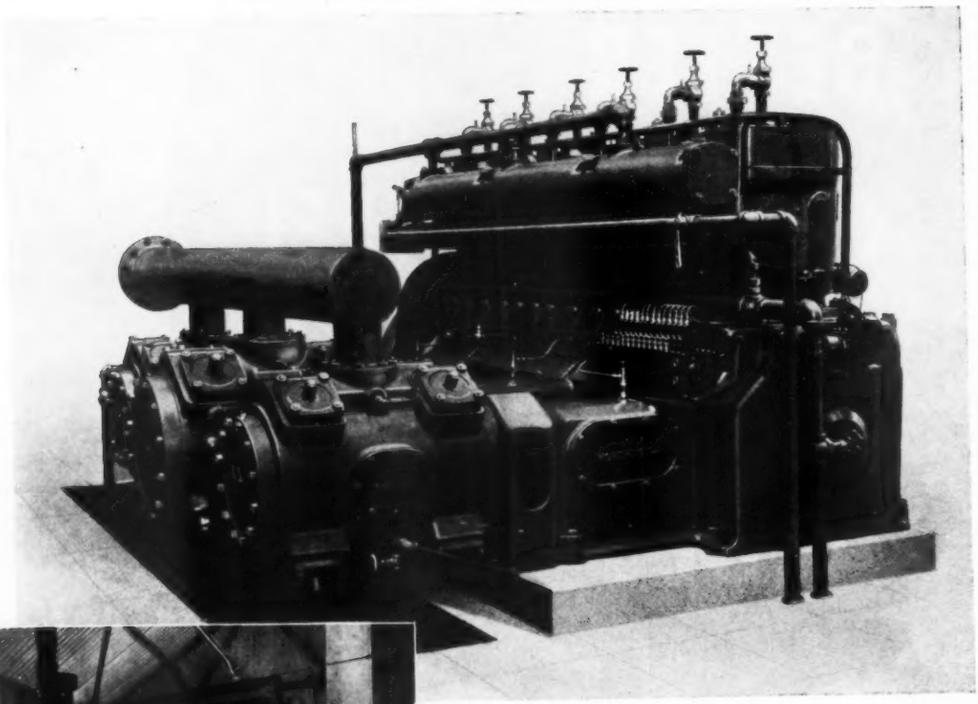
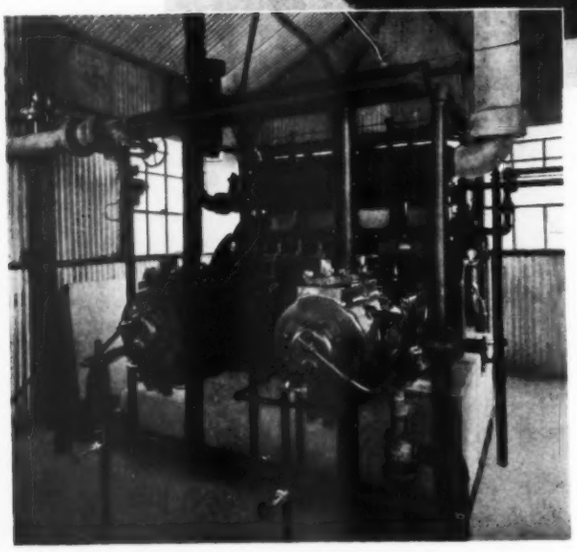


Worthington 225-horsepower Angle Gas Engine Compressor



Worthington 150-Horsepower Angle Gas Engine Gas Compressor, at Plant of Glen Rose Gasoline Company, Rodessa, Louisiana.

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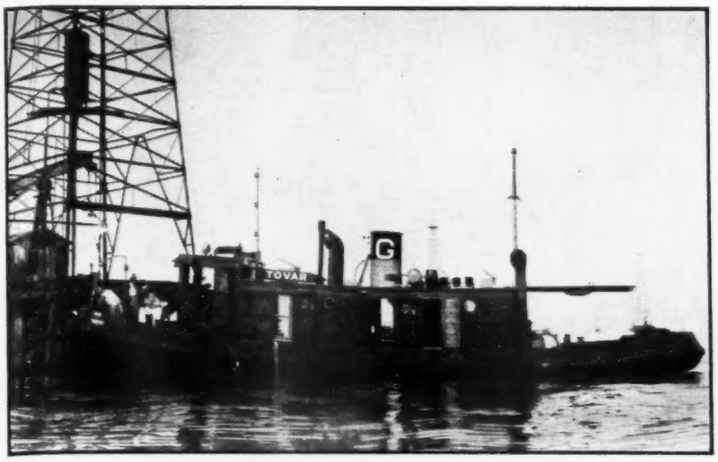


Tug "Tovar"

Transportation in Venezuela Is Big Job in Itself

By C. S. WILSON
Drilling Engineer, Venezuela Gulf Oil Co.

It is a far cry from the primitive "cayuco" fashioned from a log to the fast motor barge, derrick equipped, that loads, transports and unloads the heaviest of oil field equipment with precision and dispatch. Yet such is the reach of the transportation story of Venezuela Gulf Oil Co. in the oil fields of Lake Maracaibo. The contrast between early facilities and those developed today is indeed an interesting one.

Oil was first discovered in the Maracaibo Lake Basin a short distance inland from the lake. Since at first only land operations were contemplated, the problem of transportation was relatively simple.

Lagunillas

Then came the idea of going into the lake waters to set up drilling rigs. The transportation problem was minimized by having the first lake well spudded in at the shoreline. This was in July 1923. Such materials as were needed were brought to the site by land.

Then came the necessity of drilling off shore locations, and with it water transportation came to its full maturity. Suitable equipment for water transportation simply did not exist, and it is now a source of amusement to listen to an "Old Timer" recite how ingenuity conquered the dearth. It is told with sworn verity that the heavier pieces of drilling machinery were brought to one location on the deck of a "cayuco" barge. Three "cayucos", or dugout canoes, were spaced and lashed in place, and a rough deck of plank was laid. On this "pontoon" section the pieces of equipment were set, floated to the well and "pissanted" into place.

Such a shortage of equipment was relatively short lived, for lake operations soon broke into the boom stage and there began to arrive craft of every description to replace the emergency built wooden barges that had met the initial need.

The addition of new equipment was checked to a standstill during the depression. It was resumed recently to meet the needs of renewed activity.

Today oil field transportation on Lake Maracaibo has the proportions of a major business operation. Wharf accomodations are designed to receive, handle and dispatch materials with the least expenditure of time and labor, and transport craft is kept up to meet the needs of the day. During the early summer of this year a highway was completed between Cabimas and Lagunillas. This highway has relieved the heavy taffic on the lake and reduced the stress of emergency transport.

The transportation phase of lake operations naturally falls into three divisions: (a) transportation of men; (b) transportation of materials; (c) transportation of service units.

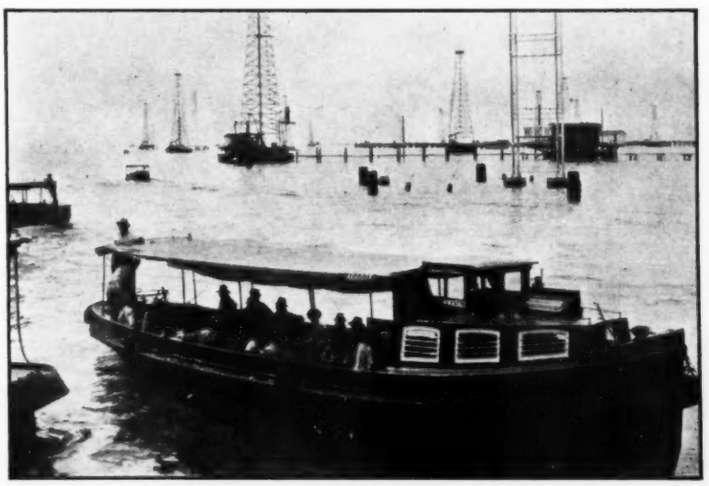
TRANSPORTATION OF MEN

Approximately 2,000 men are daily transported, to and from work in Gulf operations, over a territory extending up and down the lake coast for 30 miles. This movement of men involves an imposing array of various craft which roughly fall into two types: dories and launches.

Dories: The main traffic lanes on the lake follow a water depth sufficient to accomodate launches and tugs of moderate draft. In the developed areas these lanes are more or less defined by line racks built on driven piles. The bents of these racks are about 20 feet apart and the pipe line and walk-way support is from 4 feet to 8 feet above the water, too low for ordinary launches to pass under. For passing under these racks and entering zones of shallow water the dory has been found to be admirably suited. The ones in use are mostly of the Cape Cod type, powered by either 2- or 4-cylinder gasoline engines. The older dories are built of wood, but recently the steel hull dory of greater capacity has been put in service and found very satisfactory. The dimensions of a typical steel dory of recent construction suited to the needs of lake operations is: Length, 26 feet 6 inches; beam, 8 feet 9 inches; depth 4 feet; draft 30 inches; tonnage 9.96. The wooden dory, smaller and of lighter draft, is more suitable for small parties and for services where it is necessary to pass under extremely low structures or to work in areas of shallow water. A typical wooden dory for such service is: Length, 22 feet 4 inches; beam, 6 feet 8 inches; depth 3 feet 2 inches; draft 1 foot 10 inches; tonnage 2.4.

Launches: As applied to lake transportation equipment the word launch is broad and inclusive. There are many different designs of craft that come under this description, but all have in common the characteristic of being used for personnel transportation. Some are large open hull boats used for carrying gangs of 20 men or more; others are suited but for 2 or 3 passengers. Some are built for speed, others for moderate movement: some are relatively new, others are old. But all of them fit into many types of personnel transportation service.

In a general way the power plants of launches have been standardized. Yet this is possible to only a limited extent because of the diverse sources of the units and the chronological order of their purchase. As a result of these circumstances, and also the wide variety of size and type of craft, motors ranging from the low powered gasoline engine to the high powered diesel engine are employed.



Launch "Mocote" leaving on tour

The typical launch is of wooden construction, has a length of about 35 feet, a beam of 7 feet, a depth of 5 feet 6 inches, a draft of 2 feet 6 inches, and a tonnage of 8. From this typical launch, variations run both to the larger and smaller. For instance the passenger launch "La Rita", making the daily trip between Maracaibo and the fields is 65 feet long, has a tonnage of 35 and is powered by two semi-diesel 60-horsepower engines; while the launch Diana is but 22 feet 5 inches long, has a tonnage of 2.6 and is pow-

ered by a 24-horsepower gasoline engine.

Material transportation service must meet both extremes of requirement. It very often becomes as important to send a small bolt promptly to a location as it does to move a complete drilling rig. Facilities must be maintained to perform all the work that lies between these two requirements. The changing character of oil field requirements of necessity gives rise to a certain degree of misfit of equipment, for the things that meet the situation perfectly today may not be suitable for the work a year hence. So, in order to carry on the work at all, there is always a degree of lost motion; either there is a surplus of equipment or a shortage of it, or it is not exactly adapted to the work in hand. These factors enter emphatically in the varied and various transportation requirements of over-water oil field operations. Therefore, it becomes the chief concern of transportation management to keep the losses that may arise from this source at a minimum by coordination and adaptation.

The handling of materials on the lake is done almost entirely by three classes of craft; powered bongos, flat decked steel barges and tugs.

Bongos: The bongo as employed in lake transport is an open-hold barge of from 20 to 80 tons capacity, self propelled. It is used for such work as nipple chasing and the transport of tools and lighter materials and supplies. It is equipped with small hand hoists and a boom to facilitate loading and unloading of cargo.

Cape Cod dory at Lagunillas

Cleanout barge at Rodriguez well No. 127

Cargo Barges: Every barge is a potential cargo barge and its classification is a matter of its immediate use. By this term, therefore, is meant a barge that is employed in transitory cargo transport in contradistinction to a barge employed in special service.

Barges used in the transport of materials are invariably of steel construction, the wooden barge having passed out of use when the steel barge came on the scene. They are flat decked and vary in length from 30 to 200 feet. Some of these barges are equipped with stiff leg derricks which facilitate greatly the handling of material that must be loaded or unloaded at points away from derrick facilities. The latest addition to the cargo barge fleet is a self-powered design. This barge is driven by two 75 horsepower diesel type motors and develops a speed of 8 knots per hour; it is a vast improvement over the dumb type of barge that must be maneuvered by a tug. The power barge is also equipped with a derrick designed to handle the heaviest pieces of oil field material.

TRANSPORTATION OF SERVICE UNITS

In land operations such service units as cleanout hoists and cementing outfits are mounted on trucks or tractors for portability. The "truck of the lake" is the barge, and many cargo units are diverted to such special uses. In addition to the cleanout and cementing services mentioned, others peculiar to over-water operations are provided for. In this category come pile-driving barges, pile-pulling barges, pipe-line barges, rig-builders barges.

Cleanout Barges: The barge readily lends itself to the transportation and operation of well repair equipment. These units are towed about by tugs. When they arrive at the well to be worked on they are tied up to the piling foundation, and work of pulling tubing, bailing, or whatever is required proceeds much the same as it does with land units.

Cementing Barges: Complete equipment for handling, mixing and pumping cement into the well is carried on the cement barge. Like the cleanout barge it is towed to the place of need and tied up. Hose connections are made to the steam supply and to the well, and all is set ready for the cement. As soon as the mixed cement has been pumped into the casing the hoses are disconnected and the job turned over to the well drilling equipment to be completed.

Pile-Driving Barges: All foundations are underpinned with piles, and to drive these with speed and to sufficient bearing power is the job of the pile-driver barge. Like other special service units, the barge is towed from one point of use to another but local maneuvering for correct position is done by means of outlying anchors, the position of which is changed to meet the need.

Pile-Pulling Barges: In lake operations the foundation requirements of drilling rigs and those of later production equipment have been so varied that one large barge equipped with a special lifting hoist has been in continuous service recovering piles that have served their purpose. This barge, like the pile driver, is maneuvered locally by anchored ropes cathead pulled. With this unit thousands of piles have been recovered.

Pipe-Line Barges: The pipe-line barge is specially altered to permit the pipe to pass out at the rear with as little bending stress as possible. For this purpose a channel about 3 feet wide is cut in the rear portion of the barge in "swallow tail" fashion, and as the joints of pipe are made up the line is passed into the water at a more or less low angle.

Rig-Builders Barge. For the transportation of material, supplies and equipment for building foundations and other structures, a regular derrick-equipped cargo barge is used. This barge in addition to hand tools carries an air compressor and air tools which add greatly to the facility with which work can be done. The stiffleg derrick makes the handling of heavy beams and lumber a matter of ease such as the old strong-arm boys never knew.

Tugs: With but few exceptions the barges employed in special services and transport of materials have to be towed from place to place. To do this work requires a variety of tugs and towing craft. These vessels range from the small 40-foot wooden type with 40 horsepower gasoline engines to the larger 400 horsepower steam tugs of all steel construction. The latest type introduced in lake operations has an all-steel hull 63 feet long, a 16-foot, 6-inch beam, and draws 5 feet 9 inches of water. It is powered by one 200 horsepower 6-cylinder full diesel motor, direct reversible. This unit is used principally for inter-district and other long hauls. It has a speed of 10 miles per hour and is an ideal tug for lake service. For shallow water towing, smaller tugs are used.

The transportation phase of oil field operations on Lake Maracaibo is in itself a business of large proportions. It is no simple task to maintain and service the multitude of units required and to coordinate the movements of the various craft so as to serve the end of efficient operation in the business of producing oil.

VENEZUELA

(Continued from Page 59)

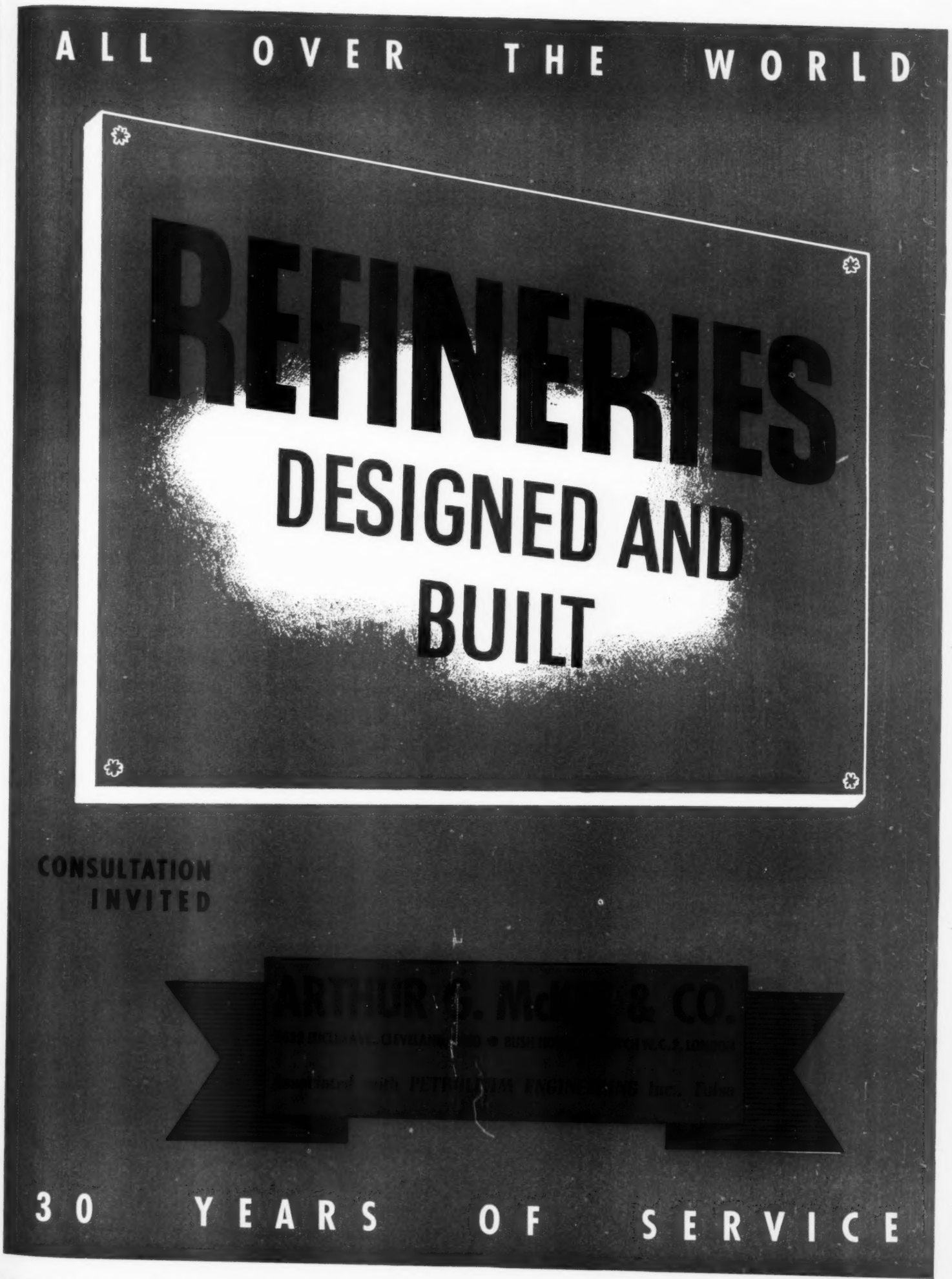
in its No. 2 Temblador, which is a little northwest of No. 1 Temblador, last reported suspended at 4,810 feet. In addition to the actual drilling program carried out or started in 1936, geophysical prospecting was extended into virgin territory by companies previously interested in eastern Venezuela and augmented by parties from perviously uninterested companies, including the Caribbean Petroleum Co., a Shell operating subsidiary.

Seismograph, magnetometer, torsion-balance and gravimeter parties were used extensively during the year along with surface and subsurface geological studies. Jungle and swamp lands in parts of eastern Venezuela handicap geological parties.

The active oil fields and proven acreage in Venezuela, according to the 1936 proceedings of the American Institute of Mining and Metallurgical Engineers, are as follows:

Field—	District	Acreage	State
La Rosa area	Bolivar	25,000	Zulia
Tia Juana	Bolivar	5,000	Zulia
Lagunillas	Bolivar	35,000	Zulia
Bachaquero	Bolivar	5,500	Zulia
Total Lake fields		70,500	
Mene Grande	Sucre	5,750	Zulia
Misoa	Sucre	85	Zulia
Rio Tarra	Colon	1,000	Zulia
Los Manueles	Colon	250	Zulia
Rio de Oro	Colon	390	Zulia
La Paz	Maracaibo	250	Zulia
La Concepcion	Maracaibo	900	Zulia
Totumo	Perija	300	Zulia
El Mene	Buchivacoa	850	Falcon
Media	Buchivacoa	40	Falcon
Hombre Pintado	Buchivacoa	150	Falcon
Las Palmas	Buchivacoa	50	Falcon
Urumaco	Democracia	100	Falcon
Cumarebo	Zamora	440	Falcon
El Mene de Acosta	Acosta	75	Falcon
Quiriquire	Piar	10,000	Monagas
Orocual	Piar	975	Monagas
Guanoco	Benitez	150	Sucre
Pedernales	Terr. Delta	20	Amacuro
Total		92,275	

Pile-puller "Duquesne"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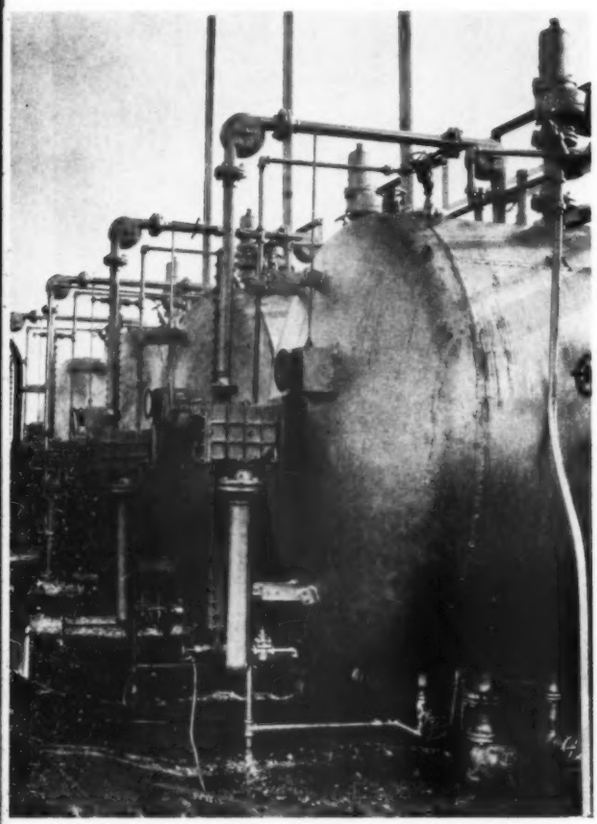

Above is a battery of butane tanks, all of which were equipped with S. & J. High Pressure Gauges to obtain the accuracy not found in other methods of gauging a liquid whose boiling point is below the freezing point of water.

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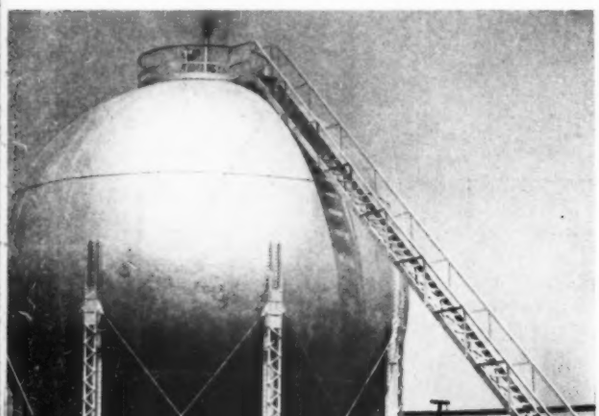

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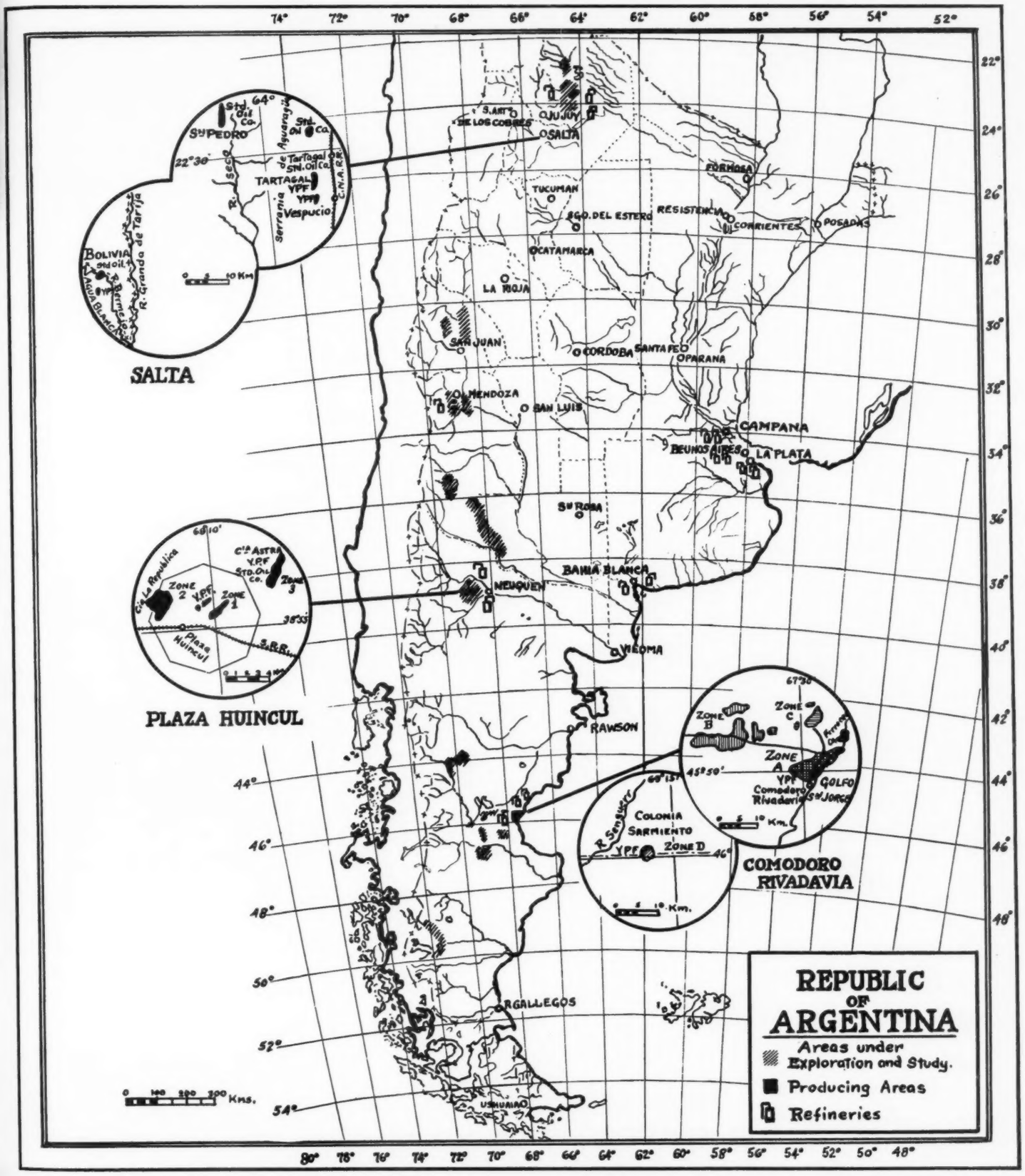

ARGENTINA

Yacimientos Petroliferos Fiscales (Y.P.F.), Argentina's integrated oil company, controlled by the government, has been granted a monopoly covering the sale of petroleum products in the federal capital of Buenos Aires, the Argentine's largest and most prolific market. Regulations placing the company in exclusive charge of petroleum sales have been prepared and will become effective in February, 1937, unless halted by Argentina courts. Steps toward monopolization of the petroleum market in Argentina by Y.P.F. have been under way most of 1936 and irrespective of other conditions, the trend was sufficiently clear to discourage drilling and other expansion by all other oil companies in the land. The Y.P.F. has fostered an aggressive drilling program for the past two years. The government company's best founded claim to successful production is in the Comodoro Rivadavia field, in the territory of Chubut where old and new wells have been completed in deeper pay horizons.

Exploration along the Atlantic coastal shelf at Comodoro Rivadavia, northeast of the old field in the Caletas Cordova and Ali, continued in 1937 through extension of the Y.P.F.'s piers and later over the shallow water. Use of electrical instruments for detection of higher oil horizons passed up originally has also proven successful.

Stifling the incentive to explore for production in most areas is the president's decree placing all national territories in an oil reserve to private companies. Exceptions may be granted, but in the event production is developed, Y.P.F. is automatically assigned all offset acreage. A limited amount of drilling has been done by private companies in

(Continued on Page 78)

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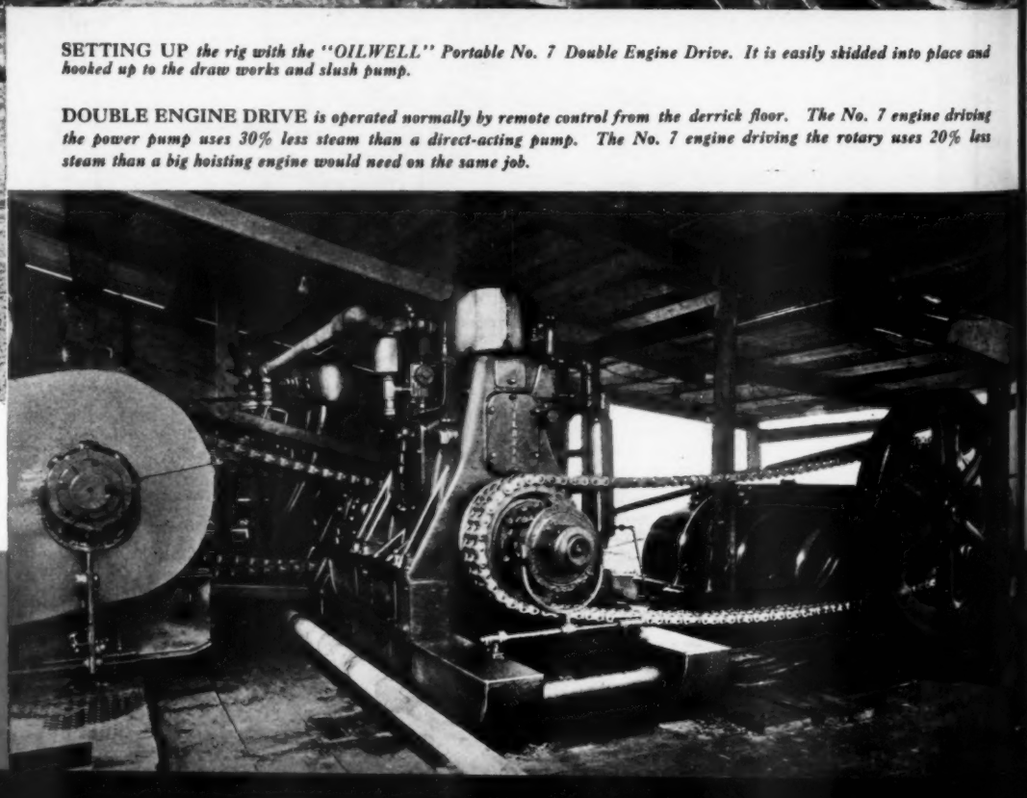

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to Save with Steam

A double engine drive operating engines singly or in tandem is Powerful, Flexible, Economical

WHEN HOISTING, engines are clutched together in tandem.

WHEN DRILLING, engines unclutched operate independently to drive power slush pump and rotary table through hoist respectively.

This unit gives ample power for medium heavy drilling . . . with lower initial cost . . . with reduced steam and fuel consumption . . . and even greater flexibility with steam than ever before possible.

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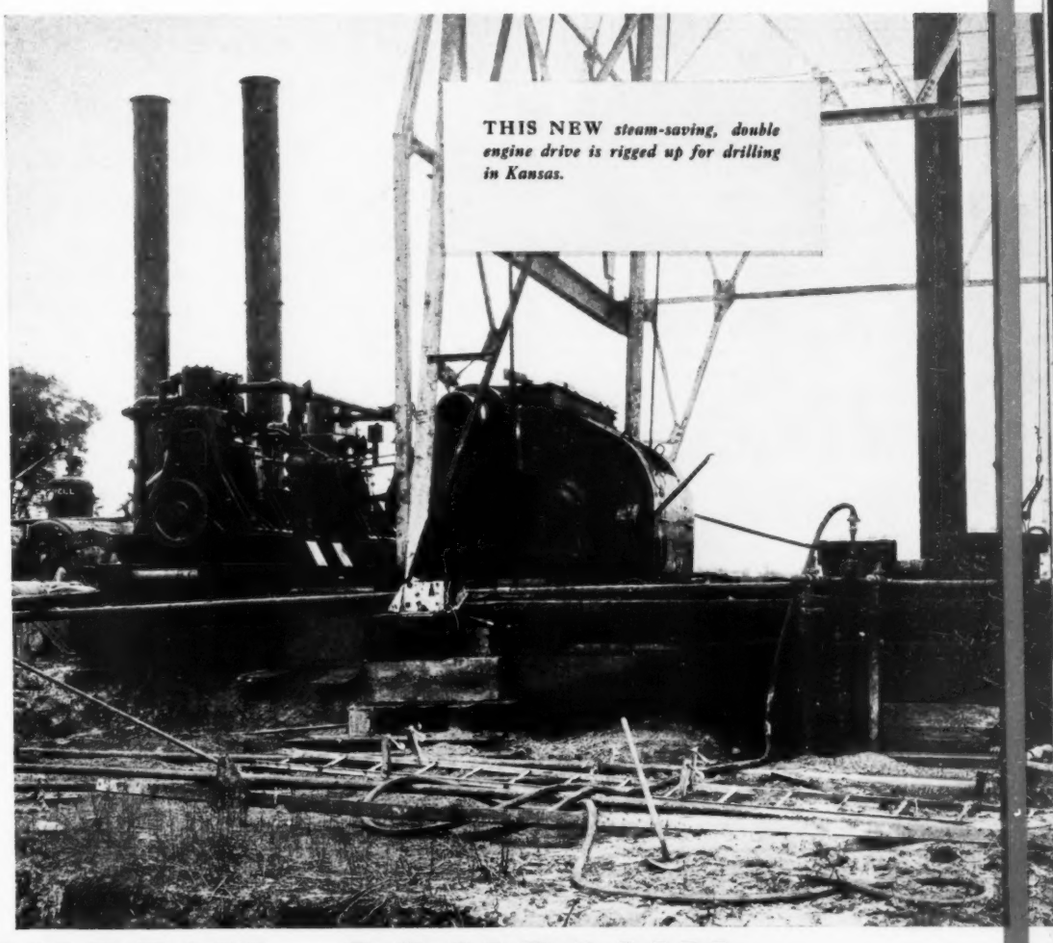


THIS NEW *steam-saving, double engine drive is rigged up for drilling in Kansas.*

OIL WELL SUPPLY COMPANY

NEW YORK and LONDON

"OILWELL"

(Continued from Page 75)

areas not subject to the president's national oil law decree, but even this work has been halted since enactment of the measures giving Y.P.F. a monopoly on the Buenos Aires market. The feeling is abroad that the monopoly will be spread to provincial proportions as rapidly as Y.P.F. demonstrates its ability to meet the demand. With the Buenos Aires market closed to private companies, there is very little attractive territory remaining over which to compete.

For the present at least, Y.P.F. will be compelled to purchase a part of its petroleum supplies either in the form of crude or finished gasoline, providing it attempts to maintain its rural outlets as well as those in Buenos Aires. Under these conditions, it is probable that private companies will continue to refine a part of the Y.P.F.'s gasoline requirements.

Largely through increased production from the Comodoro Rivadavia district, Argentina's crude output probably will reach approximately 15,007,632 bbls. for 1936, based on recovery for the first 10 months. During the first 10 months, Argentina produced a total of 12,506,357 bbls., or a daily average of 41,004 bbls. For all 1935, the production was 14,292,298 bbls., or a daily average of 40,181 bbls.

The increase of 1,782 bbls. in daily average production from the Comodoro Rivadavia and a gain of 466 bbls. in the average yield from the Plaza Huincul area were partly nullified by a drop in the Lomitas, San Pedro, Agua Blanca and the El Sosneado pools.

The following table shows this year's performance compared to 1935:

ARGENTINA PRODUCTION FOR 10 MONTHS

Field—	1936	Dly. av.	1935	Dly. av.
Comodoro Rivadavia	10,079,975	33,049	9,505,350	31,267
Plaza Huincul	863,998	2,833	767,870	2,526
Lomitas	272,782	894	220,850	726
San Pedro	1,138,304	3,732	1,206,630	3,969
Agua Blanca	104,821	344	164,790	542
Cacheuta-Tupungato-Mendoza	34,399	112	30,370	100
El Sosneado-Mendoza	12,078	40	14,380	48
Total	12,506,357	41,004	11,910,240	39,178

Argentina is capable of producing only about 62 per cent of its petroleum requirements and is dependent on imports, largely in the form of crude, fuel oil and diesel oil for the difference. The country's refining capacity is adequate, but so far the production has not reached consumptive levels.

During the first 10 months of this year, Argentina imported approximately 8,286,000 bbls. of petroleum, compared to 7,194,500 bbls. for the same period in 1935. This year's imports were divided, 3,955,630 bbls. of fuel oil, 2,740,190 bbls. of crude, 1,581,880 bbls. of diesel and 8,280 bbls. of gasoline. In 1935, the division was 3,042,200 bbls. of fuel oil, 2,408,710 bbls. of crude, 1,722,200 bbls. of diesel oil and 31,390 bbls. of gasoline.

Based on indicated consumption of about 70,904 bbls. of oil per day, or its equivalent in gasoline, kerosene, fuel oil and other products, the year's requirements will total 25,879,960 bbls. Assuming production continued through the year at the rate existing in the first 10 months, there will be an actual shortage of 10,872,338 bbls.

For the first 10 months of 1936, the Y.P.F. is credited with production of 5,598,964 bbls. while private companies recovered 6,906,393 bbls. The relationship in various areas between Y.P.F. and private companies is shown in the following table:

TEN MONTHS' PRODUCTION IN BARRELS

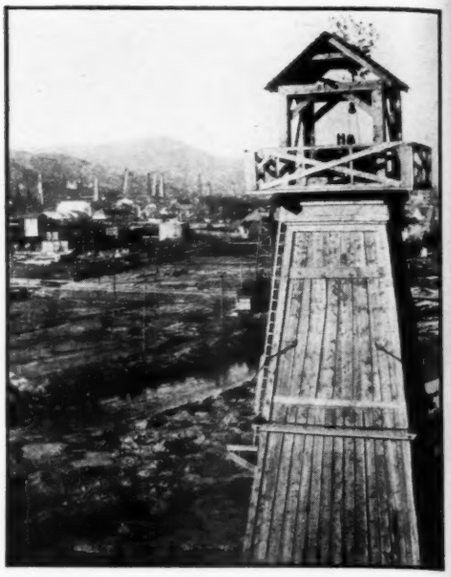
Comodoro Rivadavia	5,001,880	5,079,095
Plaza Huincul	397,020	466,378
Salta*	165,857	1,350,050
Mendoza†	35,207	10,270
Total	5,599,964	6,906,393

*Listed as Lomitas, San Pedro and Agua Blanca in other table. †Listed as Cachueta, Tupungato and El Sosneado (Mendoza) in other table.

ROUMANIA

(Continued from Page 65)

enormous activity in the plains of the Dambovita province. This marked progress has only been brought about by the application of geophysical methods. Several concerns have employed geophysicists from the United States to trace out the various anticlinals in the level area. In the Phahova Province, which lies to the east and which, of course, is where the original development of the Roumanian oil industry took place, the districts of Boldesti, Harsa and Chituran continue to be developed with considerable success.



Roumanian field seen from a derrick.
—(Underwood)

owing to the presence there of more porous strata permitting rapid drilling and yielding large production.

A most interesting phenomenon in the Dambovita district is a well of the Redeventa Co., at Margineni at the edge of the plain right up against the foot hills. This well, at a depth of about 5,940 feet struck a source of white oil of a specific gravity of 0.710, containing, according to different reports, 60-80 per cent benzine and no residue. This is similar to the oil that used to be produced at Sourakhani (near Baku).

TOTAL PRODUCTION OF THE FOLLOWING PETROLEUM COMPANIES FOR THE FIRST NINE MONTHS OF THE YEAR 1936

(Quantities in Continental tons, 1,000 kgrs.)

Name of company—	Province Dambovita	Province Prahova	Province Bacau	Province Buzau	Total
Astra Romana (Royal Dutch-Shell)	346,949	1,067,387	.....	.....	1,414,336
Steaua Romana (Franco-Anglo-Roumanian)	770,758	332,100	25,994	25,983	1,154,835
Concordia (Belgian)	931,862	17,582	.....	.....	949,444
Unirea-Roum. Const. (English)	462,411	307,296	.....	.....	769,707
Colombia (Belgian)	511,954	45,431	.....	1,497	558,882
Romano Americana (Standard Oil Co. of New Jersey)	168,347	281,669	.....	.....	450,016
Creditul Minier (Roumanian)	83,295	282,526	.....	.....	365,821
Prahova (Italian)	297,477	2,724	.....	.....	300,201
Total	3,573,053	2,336,715	25,994	27,480	5,963,242

This, of course, is very deep drilling for Europe, being 7,000 to 10,000 feet down.

As an indication of the productivity of the original oil areas in the Prahova Province, i. e. in the Moreni district, it is worthy of note that the total yield up to the present is calculated to be something like 20,000 tons per acre. Petroleum is generally to be found in the provinces of Dambovita, Prahova, Buzau and Bacau, but development has been carried on most extensively in the provinces of Prahova and Dambovita, mainly

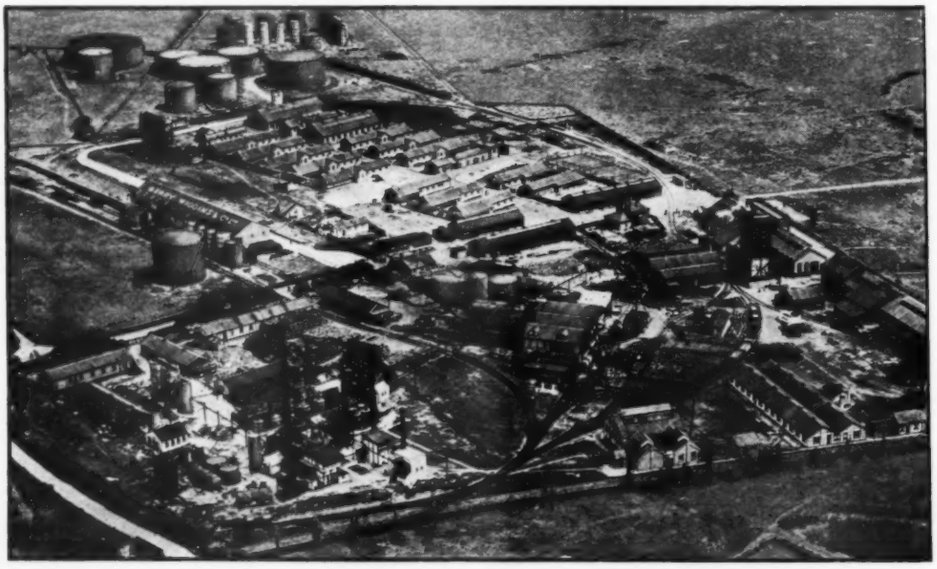
EXPANSION IN REFINING

On the refining side also 1936 has witness equal progress. At least 97 per cent of the production is refined in Roumania. The refineries of Roumania have a total capacity well over 12,000,000 tons, among which are cracking installations for dealing with some 1,500,000 tons. Among the concerns with cracking plants are Romano Americana, Astra Romana, Steaua Romana, Creditual Minier and Colombia, while the Petrol Block Co. has already made arrangements for the erection of such an installation.

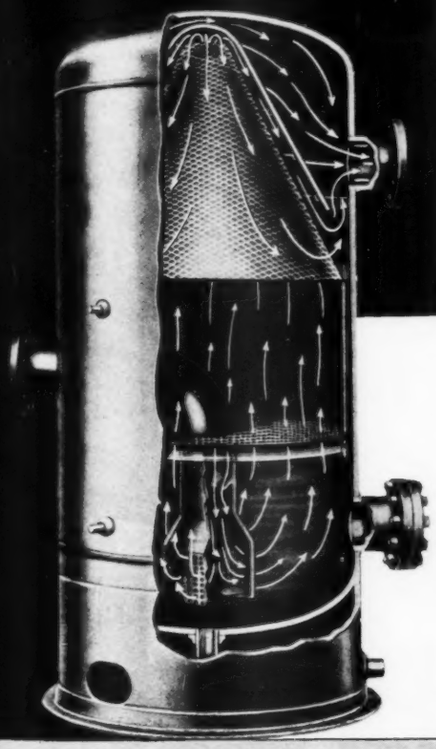
There are furthermore some 25 installations on the fields for the extraction of gasoline from natural gas.

Generally speaking, of the benzine produced in Roumania, about 20 per cent is consumed in the country and, say, 80 per cent exported. It is worthy of note that Roumania, in fact, is becoming gradually intersected with a network of first-class roads paved with asphalt produced in the country.

At the conferences of the Inter-Parliamentary Commission the Roumanian producers contended the main part of the selling prices of oils abroad went to the governments of the consuming countries in the form of taxes and rationalization at the producing end could in such circumstances make but little difference to the sale price.



Refinery of Berry Wiggins & Co. Ltd. located at Kingsnorth-on-the-Medway, Kent, England. The refinery is unusual in that its operation centers in the production of asphalts and other heavy oils



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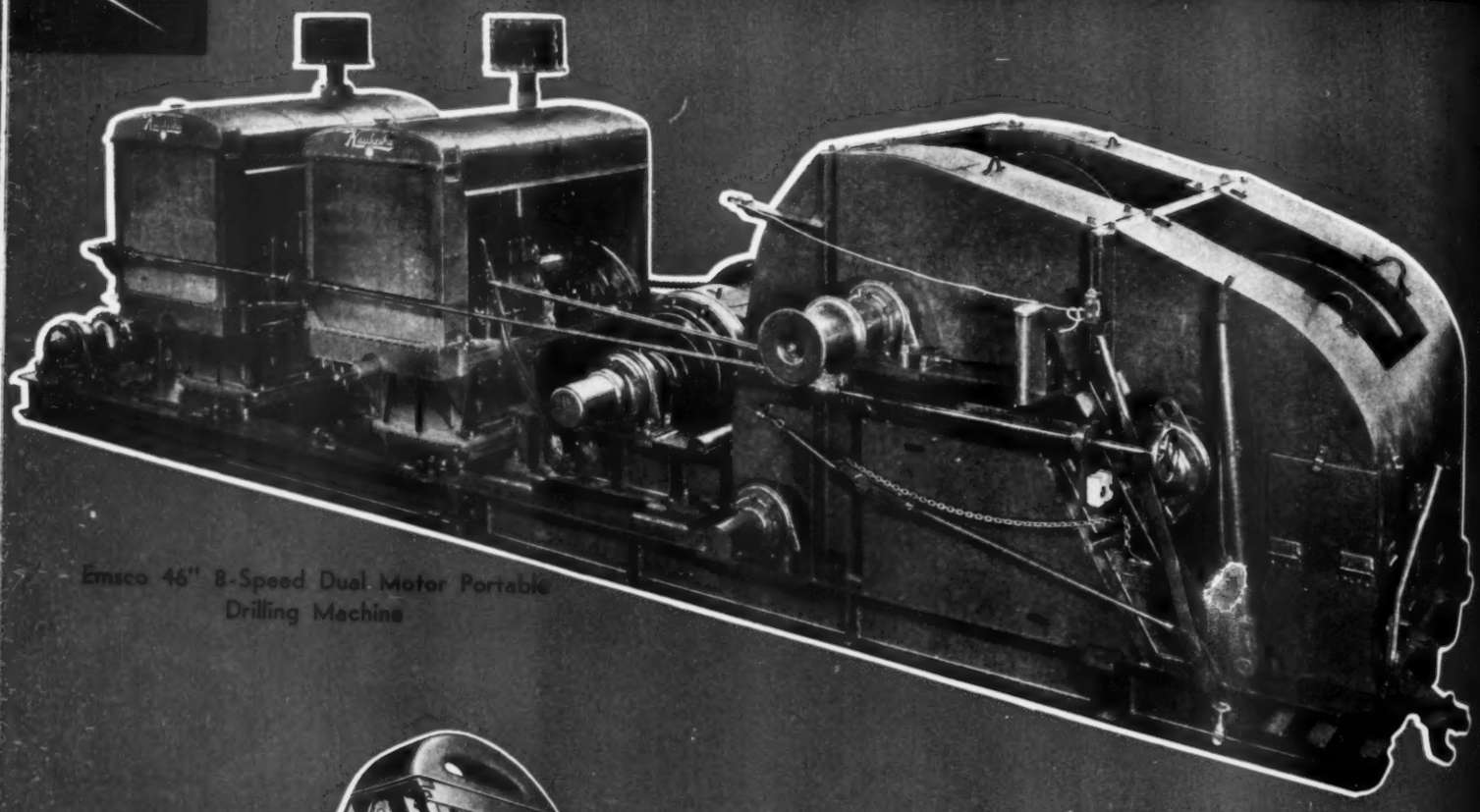
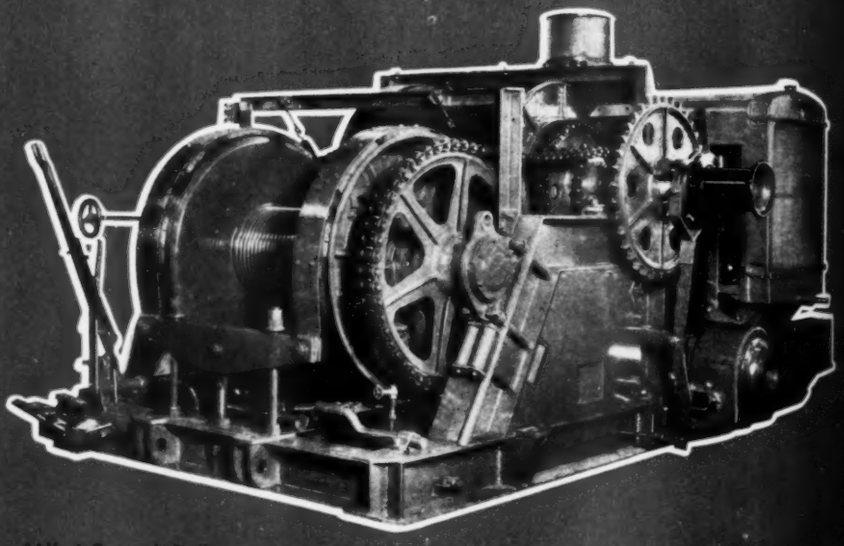


Emsco 46" 8-Speed Dual Motor Portable Drilling Machine

Emsco 76" Traveling Block—300 Ton



46" 4-Speed Pulling Machine W Multiple Clutch on Drum Shaft

Emsco Type B-6 Swivel

CONTIN

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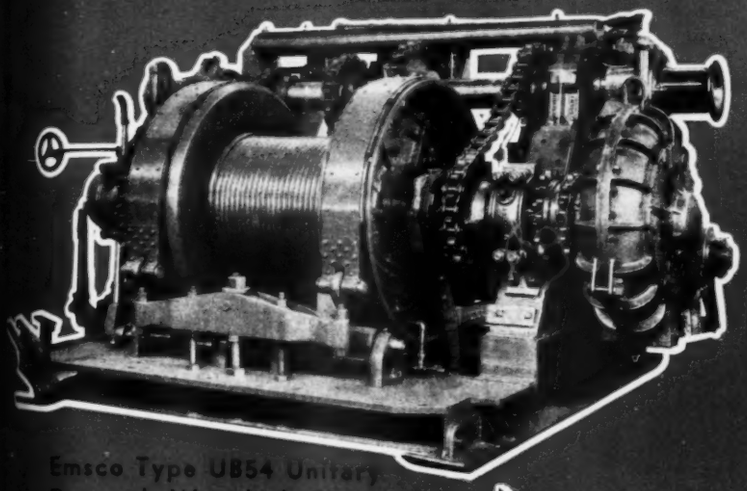
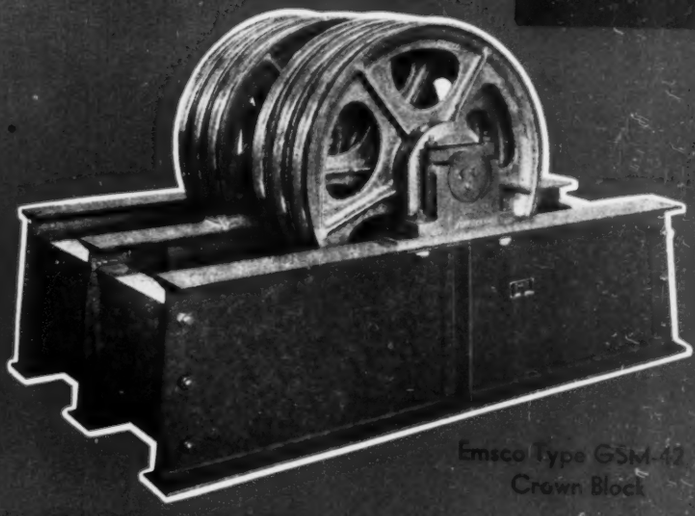
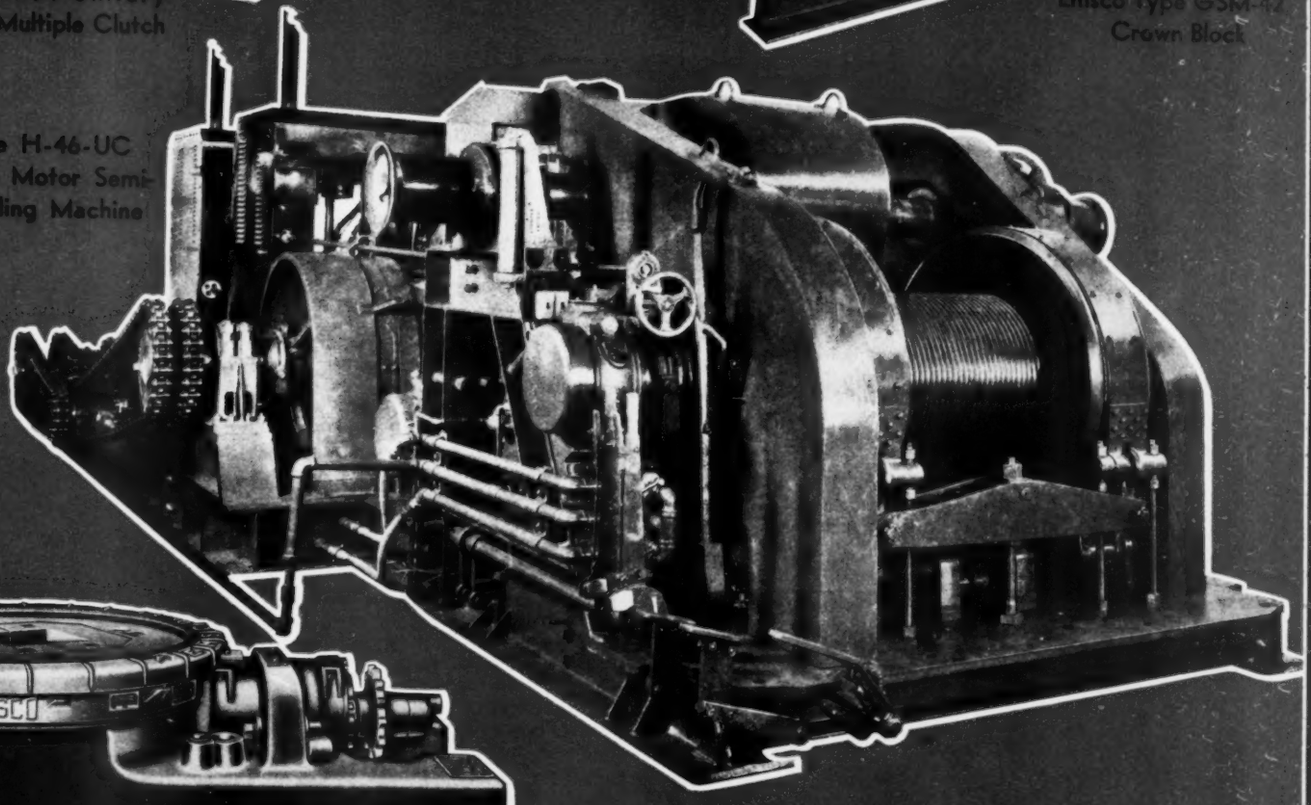


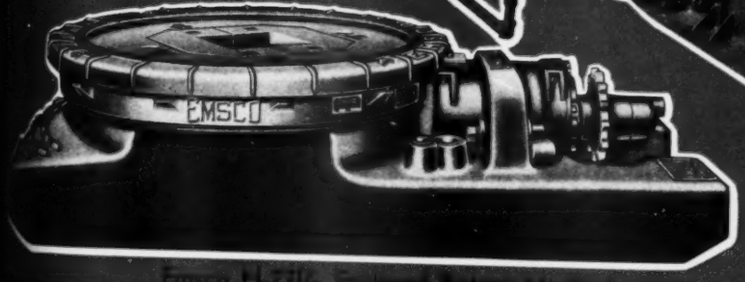
Emsco Type UB54 Unitary Drawworks W Multiple Clutch



Emsco Type GSM-42 Crown Block

Emsco Type H-46-UC 8-Speed Dual Motor Semi-Portable Drilling Machine





Emsco H-27½ Enclosed Rotary Machine

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Soviet Reports

ALL TIME PEAK

in Production

REFLECTIONS—*Bay of Ilyich oil field, Baku, U.S.S.R.—(Sovfoto)*

U.S.S.R.

Despite handicaps, the U. S. S. R. will terminate 1936 with a new all-time production peak of approximately 190,000,000 bbls. Through the first ten months of 1936, it produced approximately 158,500,000 bbls., or about 10 per cent above the first 10 months of 1935. Despite the indicated all-time production peak U. S. S. R. will fall nearly 23,000,000 bbls. short of the quota for this year which was set at 213,310,000 bbls.

As was true the preceding year, the Soviet refining branch of the oil industry gives indication of falling only 5 per cent short of plan fulfillment. The refineries have run approximately 461,000 bbls. of crude daily to stills during the first 10 months of 1936, indicating a total of 168,265,000 bbls. will have been processed by the end of December. The 1936 planned quota was 175,800,000 bbls. of crude to stills.

Approximately 20 new cracking units were added at various refineries during 1936. Work was launched to erect additional solvent refining capacity at Grozni and polymerization was employed at one refinery. Both the polymerization and modern solvent plants were erected or contracted for erection by American firms. Most of the cracking equipment was supplied by Soviet manufacturing plants and construction work was done under supervision of U. S. S. R. engineers.

Efforts to bring crude oil production and refining to full quota specifications are being pursued diligently. A commission of U. S. S. R. engineers, headed by M. Barinov, made a detailed study of American production methods and results last summer. Barinov, head of Glavneft, reported on his return to Russia that Soviet petroleum workers are not taking full advantage of the equipment and material available with the result that drilling speeds average low and that hundreds of wells are idle which in America would be producing by pumping or by utilization of gas-air lift.

Little use has been made of steam in Soviet field practice. Even wildcat exploratory holes are drilled with electric power, meaning that drilling operations can not be started in advance of power line extensions. The Barinov commission also found occasion to criticize the Soviet oil trusts for delays created by lack of suitable living accomodations for workers and for failure to use small internal combustion engines where conditions warrant.

The commission was particularly interested in deep well pumping methods and equipment used in America and if orders issued by S. Ordzonikidze, Commissar for Heavy Industry, are followed many of the idle Soviet oil wells will be returned to production in 1937. Scores of wells have been idle for months and lack of coordinated effort in management of the various fields it was said has contributed to their inactivity. Furthermore, some of the idle wells were beyond reach of the available pumping machinery. But despite internal and external criticisms certain headway has been made in most of the fields in the matter of producing small wells ranging to 20 bbls. or less.

In an effort to overcome some of the production practice deficiencies, the Commissar for Soviet Heavy Industries has decreed that not less than 14 new oil fields must be brought into operation in 1937. The Commissar has also ruled that not less than 20 new fields must be developed to commercial proportions in 1937 while the production branch continues with drilling and development in the existing commercially productive regions.

Intensified exploration has been ordered for 1937 in the Grozni, Maikop, Bashkiria, Emba, Baku, Kergezneft, Kamaneft, Middleasia, Vostokneft and Turcomania districts.

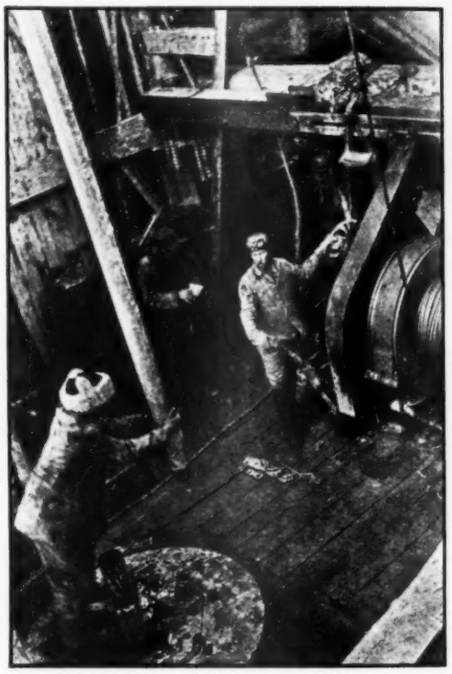
Success of the projected plans of the U. S. S. R. depends in a large measure on how managements of the various trusts adapt equipment and operating methods to their conditions. Drillers have much to learn in the problems of mud conditioning, it is indicated by frequent complaints from the offices of high officials over the loss of holes and delays due to caving.

Successful extension of the Baku area 50 miles southwest into the Saliana-Aliat district at Pirsagat in the early part of 1936 was one of the year's important developments. Orders have been issued to extend prospecting in the Baku region in 1937 over Bozdag, Karadag, Khamadag, Sarinch-Gulbak, Bendovani, Eldarovo, Khiderli, Bendovani, Adaurt and Kalaus. The 50-mile Baku area extension at Pirsagat, in the Saliani steppes, was completed in February, 1936, for an initial of 3,000 bbls. of 34 gravity crude from 4,200 feet.

Increasing interest was devoted this year to the extensive, shallow, thick sand zones on the Apsheron Peninsula which have been neglected, in favor of the gusher type production available elsewhere. Observations of the engineering commission on maintenance of small pumping wells in the United States probably will be further reflected in future producing policies.

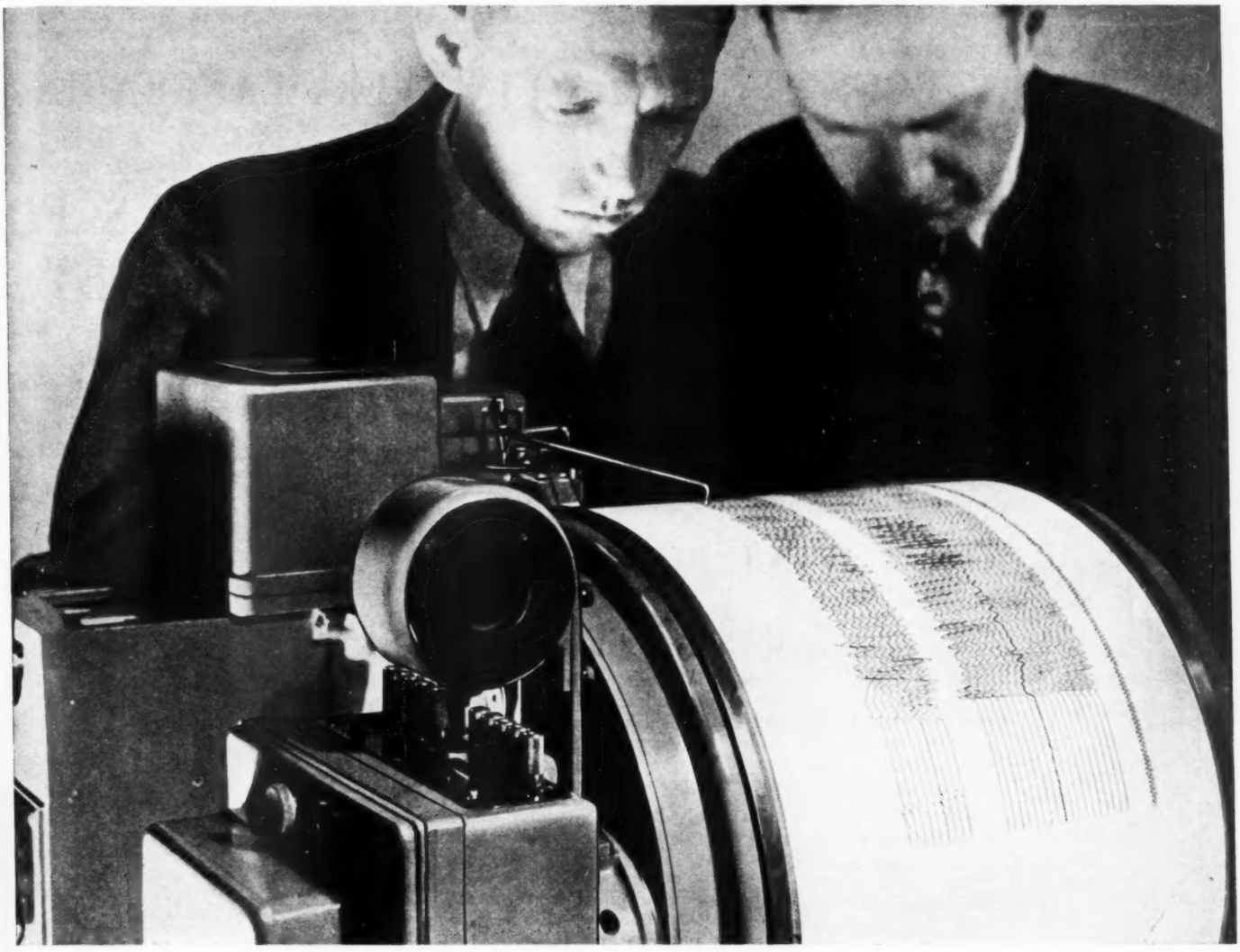
Soviet authorities continue to stress development of the Lower Oural-Permian Basin (Bashneft) district, 80 miles from Ufa, which, from a strategic location, probably justifies the importance it is being accorded. The area is near four trunk railroads leading from European Russia to Siberia and Turkestan. It is within 200 to 400 miles of some of the industrial centers now under development and is nearer the western frontiers by approximately 500 miles than other large sources of Soviet crude oil production. First substantial production from the Ishimbaevo area was discovered at about 2,500 feet in 1932. Since early in 1936, when there were 70 completed wells and 45 on production, drilling has continued and upwards of 50 wells have been added. The area is still dependent on tankcars for movement of crude to the Saratoff refinery on the Volga River, about 430 miles away, but Alco International, subsidiary of Alco Products, Inc., is nearing completion on a 12,000-bbl. per day refinery which will operate exclusively on Ishimbaevo district charging stock.

Nearly a dozen structures similar to Ishimbaevo have been mapped by Soviet geologists or partially proven by drilling in the Sterlitamak district. The 1937 program calls for production of



SPEEDING UP U.S.S.R.—*Stakhanov well in Azizbekov field, at Baku, Azerbaijan S.S.R. Brigadier Pyatkin, at brake, earns bonus by employing Stakhanov methods, eliminating waste motions.—(Sovfoto)*

DRAIN LAKE TO FACILITATE DRILLING—*Ramaninsky lake, Baku.—(Sovfoto)*



DRILL FEWER DRY HOLES THIS YEAR

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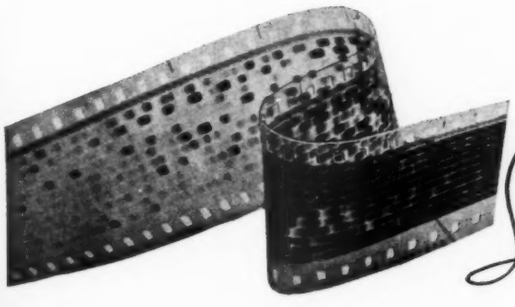
A limited number of field parties is available for work in California, Mid-Continent and Gulf Coast Fields.



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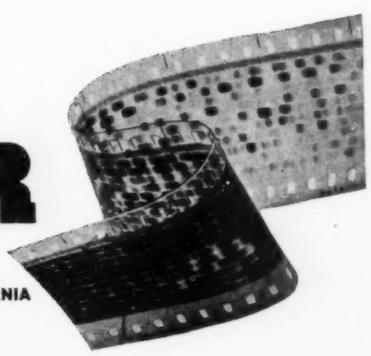

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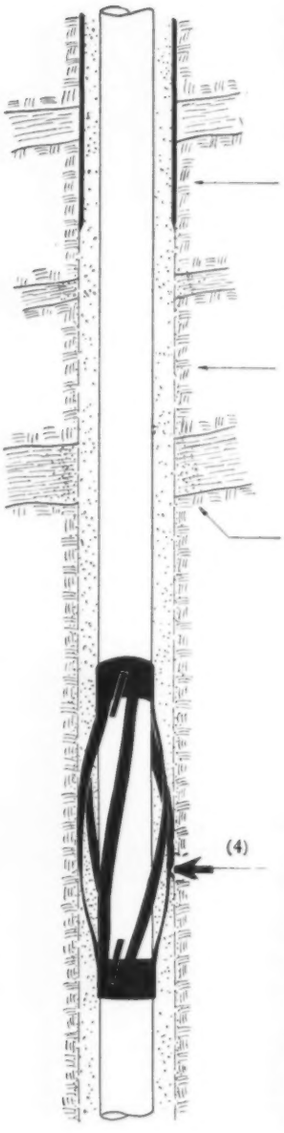


COSCO WELL BORE CLEANER AND CASING CENTRALIZER

(1) Shows lining of mud on bore smoothed out after COSCO Cleaner has passed downward.

(2) Shows mud removed from well bore by upward movement of the COSCO Cleaner, permitting a solid bond of cement between the casing and the formation.

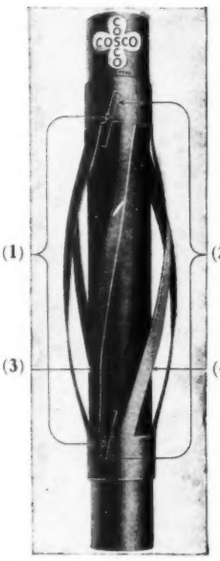
(3) Shows how cement entered water sand and formed concrete, thus making a positive water shut-off.

(4) Shows the Casing centralized in the hole. Cement can be distributed evenly and entirely around Casing.

Cement jobs often fail because a thick lining of mud on the well bore, channeling of cement and leaning casing prevent a positive water shutoff. The new COSCO Well Bore Cleaner and Casing Centralizer helps to *shut the water off permanently!*

Built solely for the purpose of preparing a well for a perfect cement job, this unique tool scrapes the lining of mud from the well bore so that the cement can unite with the formation. As the drilling fluid passes the Cleaner, the fluid develops a whirling action which helps to prevent channeling. The casing is centralized in the hole so that cement can be distributed evenly and entirely around it. Due to these COSCO advanced features, a complete cement bond is formed between the casing and the formation thus assuring a positive water shut-off.

COSCO Well Bore Cleaners and Casing Centralizers are available in all sizes to fit any requirements. Write for latest literature.



(1) Shows method of preventing COSCO Cleaner from rotating by use of lugs on Casing.

(2) Shows method of pulling the COSCO Cleaner downward or upward by use of lugs in slotted collars.

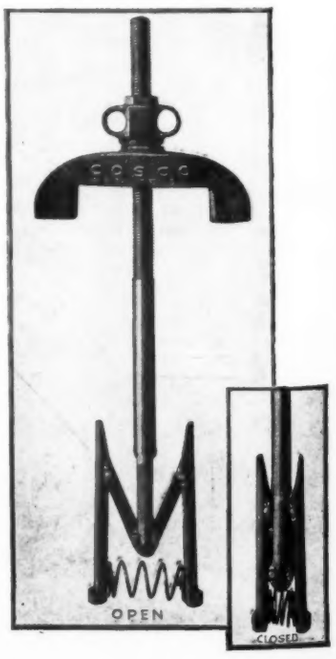
(3) Shows the smoothing edge of the springs. The opposite is the scraping edge.

(4) Shows angular pitch of spring, which acts as a fin to the fluid.

COSCO LINER PULLERS

COSCO Liner Pullers are built *extra-strong* for the hardest service and provide complete satisfaction wherever used. These advanced Liner Pullers are available in two models—the COSCO Senior for Slush and Heavy-Duty Pumps—pulls 5″ to 10″ Liners; the COSCO Junior for BOILER Feed, General Service and Pumps with Light Liners—pulls 2-3/4″ to 8″ Liners.

COSCO Liner Pullers have no slips or dogs to ruin Liners. The shoulders on the adjustable legs lock securely behind the Liner rim and out comes the Liner—easily, quickly and without damage. Compare this COSCO efficiency and simplicity with old-style or ordinary Liner Pullers and you have the reason for COSCO supremacy throughout the oil fields of the world. Write for latest literature.



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not less than 12,000,000 bbls. of crude from the area, with drilling to continue in Ishimbaevo and Kuspiakulovo. Exploration of some of the other structural features is also planned with a view to increasing the proven underground reserves.

Completion this year of a refinery at Orsk with distillation capacity of about 10,000 bbls. daily and augmented with two cracking units capable of handling 6,500 bbls. daily will give a direct outlet by pipe line for Emba district production. The Emba crude is a premium lubricating stock and straightrun gasoline from Koschagil crude tests 76.5 octane compared with 60 from Grozni and 70 from Baku crudes. A pipe line was completed in 1935 from Emba district to Orsk, where the refining facilities are located. The Emba district has been compared in some ways with the Texas Gulf Coast due to the existence of numerous salt domes, but those in Russia are highly faulted and present drilling and production problems not common.

The Emba program for 1937 provides for extended prospecting in the East and North Iskine areas and on a number of designated features along the Guryev-Orsk pipe line and along the Guryev-Kondagatch railway under construction.

In 1936 there were 22 new refinery units started or completed ranging from two large stills capable of processing about 40,000 bbls. daily at Baku to comparatively small cracking units at Moscow, Odessa, Berdiansk, and Kherson. Baku and Grozni were each equipped with four new cracking units during 1936 while two units were built or started at Orsk and Saratov.

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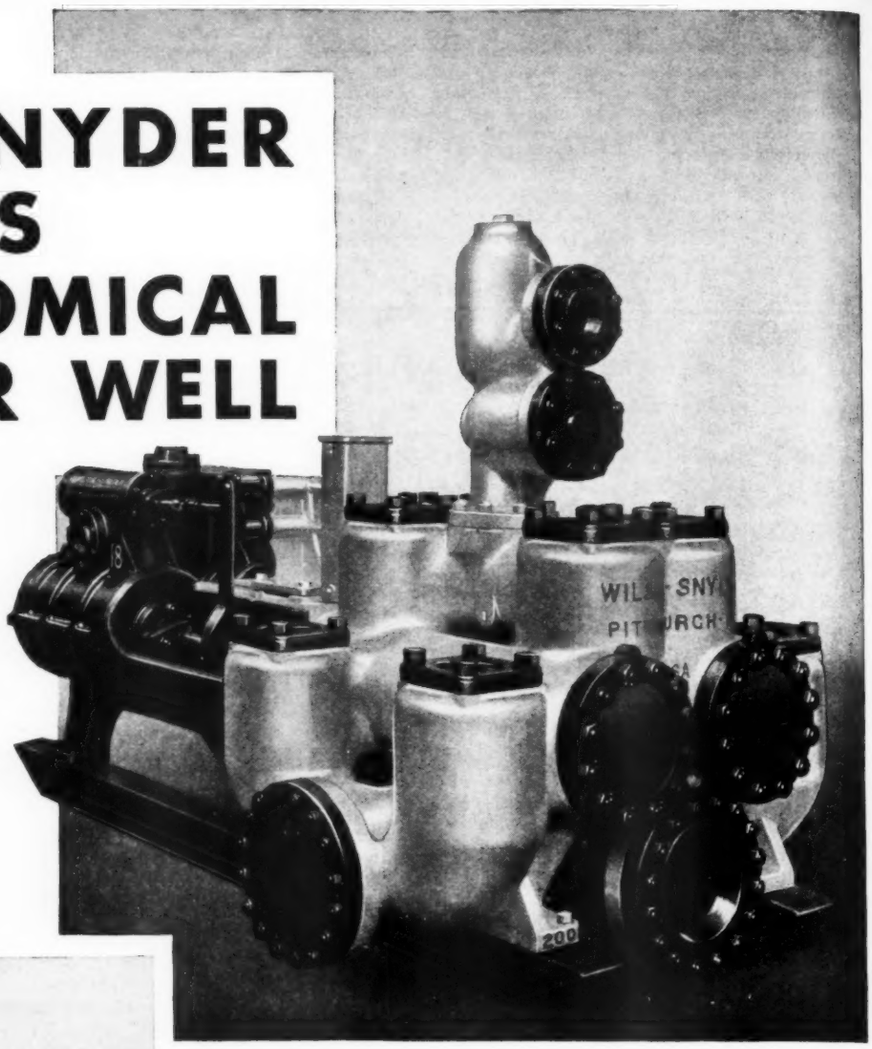
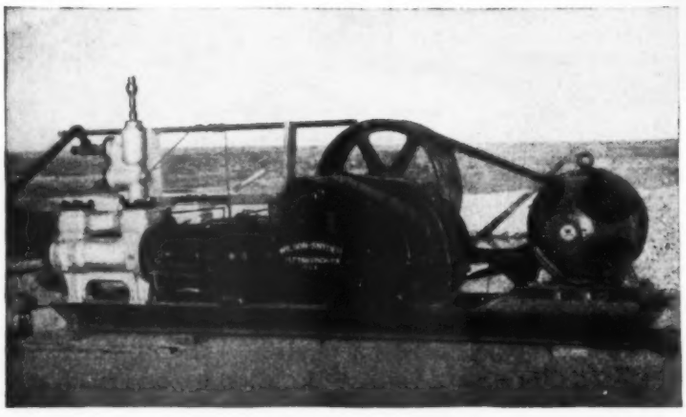


The famous **No. 18** *Steam Driven Slush Pump is known throughout the world for its dependability in high pressure drilling.*



With any type of prime mover, Wilson-Snyder Power Slush Pumps are economical and dependable. Six sizes are available.

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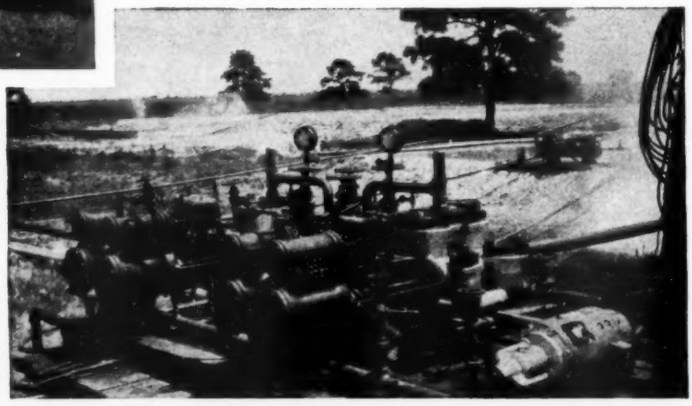

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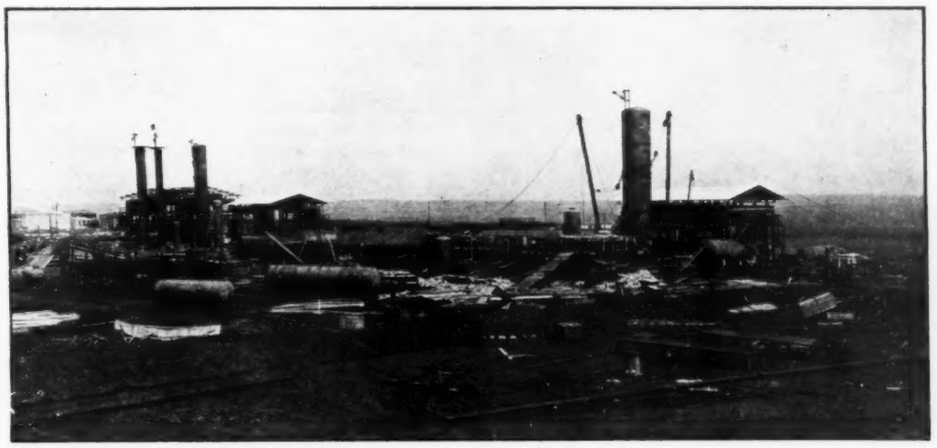
High Octane Gasoline Is Made in Soviet Refinery



Refinery under construction near Ufa

About two years ago representatives of the U.S.S.R., through Amtorg Trading Corp., solicited bids on a modern refining plant to produce the highest grade gasoline equal to that currently sold in the United States, from a very low valued crude oil. Some of the problems involved may be visualized by describing the conditions under which this new and ultra-modern plant would have to operate. Test runs through the plant started this month.

Crude oil has been known for a century around the Caspian Sea in U.S.S.R. and refining technique has been developed to a high degree but this oil is low in sulfur and relatively easy to refine. In fact, some of the Baku oil is similar to our own valued Mid-Continent crude oil. The newly discovered oil, however, found about 1,000 miles northeast of Baku, in the foothills of the Ural Mountains, proved to be an oil similar to light Mexican or West Texas high sulfur oil. The oil is found in the Sterlitamak fields (called Ishimbaevo) near the town of Ufa.

The important properties of this oil are represented by the following analyses which were the result of studying a composite sample made up from proportionate amounts of oil from several producing wells.

PROPERTIES OF STERLITAMAK CRUDE OIL

Gravity, Deg. A.P.I.	30.1
Sulfur, per cent by weight	3.0
Water	Trace

100 c.c. A.S.T.M. Distillation

	°F
Initial boiling point	110
5% off at	190
10% off at	250
20% off at	352
30% off at	432
40% off at	568
58% off at	672

(Vacuum Distillation) 100 m.m. Hg

60% off at	725
70% off at	820
80% off at	959
Residue, per cent by volume	18.5
Losses, per cent by volume	1.5

A preliminary study of this oil indicated that it is impossible to produce a satisfactory grade of gasoline by direct distillation of the crude since the gasoline is only 48 octane and carries about 0.5 per cent sulfur. The U.S.S.R. demands call for the most flexible plant it was possible to built due to the isolated location of the proposed plant and due to the varying demands of the community which it will serve. With these ideas firmly fixed the U.S.S.R. and Alco engineers carried on extensive semi-commercial scale experiments to determine how aviation gasoline, automobile gasoline, diesel oil, fuel oil and high grade road asphalt could be made.

The result of this investigation indicated that the following units would be necessary in order to make the plant flexible.

1. Two-stage topping unit.
2. Two-stage cracking unit with reforming unit separate.
3. Centrifugal acid treating plant.
4. Two-stage rerun unit.
5. Complete doctor sweetening and recovery unit.

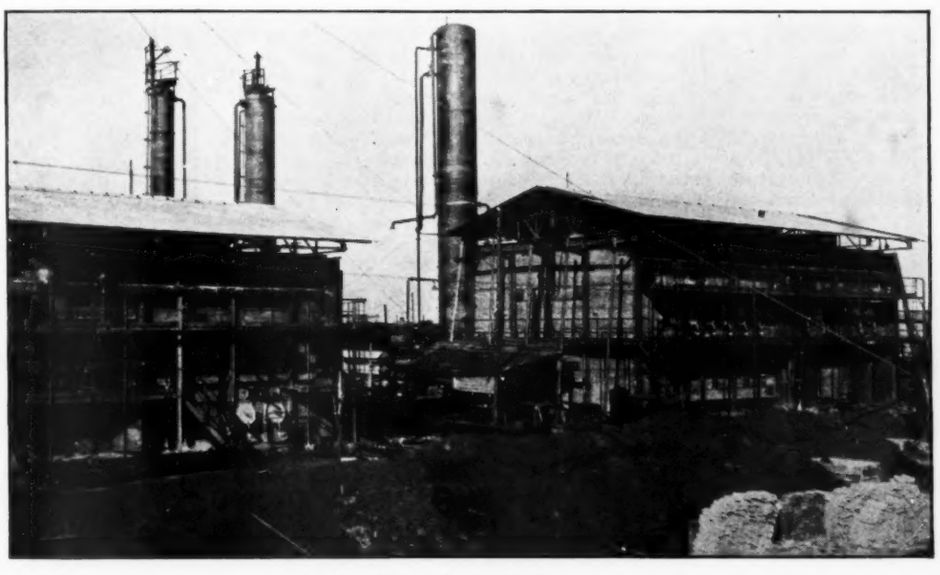
The Sterlitamak plant was designed with these fundamental units as the basis. The plant as designed and constructed processes 12,000 bbls. of Sterlitamak crude oil per day and produces a high octane (aviation) gasoline, motor gasoline, cracked fuel oil, cracked asphalt, natural asphalt, diesel and tractor fuel, and fixed gas.

The plant was designed for maximum yield of motor gasoline and natural asphalt. The design also included provisions for maximum flexibility which allows the segregation of a fraction of high-octane gasoline and a lower yield of motor gasoline, with other phases of the operation remaining the same. For either operation, if natural asphalt is not desired, reduced crude can be charged to the cracking unit, eliminating the natural asphalt, but increasing the quantity of cracked asphalt and motor gasoline.

UNUSUAL FEATURES

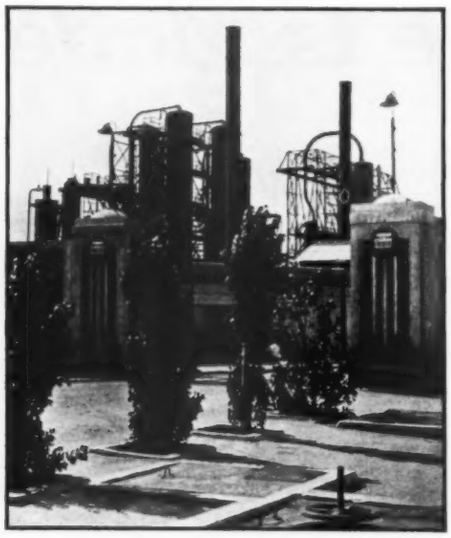
Each individual unit may run on variable operating factors with minimum sacrifice in efficiency. In order to accomplish these results consideration has been given to the following features of design:

1. Independent operation of the two-stage distillation unit to permit operations at slightly reduced capacity, due to lower preheat, when the cracking unit is shut down for cleaning.
2. Independent operation of the reforming unit permitting this plant to run at full capacity with naphtha from storage if desired.
3. The two-stage cracking unit and flash tower have been designed to process gas oil, or reduced crude, permitting the production of either cracked or natural asphalt.
4. Independent stabilization of the high octane and motor gasoline, with provisions for blending the total absorbed gasoline with the high octane gasoline.
5. Independent operation of the treating and rerun units, so that stabilized products may be continuously processed from storage.
6. Provisions for steam or hot gas oil as the heating medium for the rerun unit to maintain continuity of operation independently of the cracking unit.
7. Centralized control of the distillation, reforming and cracking units.
8. A complete complement of laboratory control equipment for control of plant operation.
9. The gas plant has been designed for the recovery of a liquid fraction consisting of propane, butane, propylene and butylene, as an overhead from the stabilizer in the event it is desired to install a polymerization plant at some future date.



Cracking and reforming furnaces

The crude charge is taken from storage, pumped through the vapor heat exchanger on the fractionating tower of the two-stage cracking unit and is introduced into a settling drum at approximately 200° F. The charge then flows through additional heat exchangers on the vacuum stage unit and is then introduced into the atmospheric section of the tube still where the crude oil is heated to obtain the desired degree of vaporization. There is withdrawn from the atmospheric fractionating tower gasoline, reforming naphtha, gas oil, and reduced crude bottoms.



Beautifying site of Soviet refinery.—(Sovfoto)

The reduced crude is pumped hot from the base of the atmospheric tower and flows through a separate radiant section in the same furnace and is then introduced into the vacuum fractionating tower. The latter tower produces continuously two gas oil fractions and specification asphalt bottoms. If it is desired to charge reduced crude directly to the cracking unit, the crude is divided after passing through the convection bank of the furnace and parallel streams then flow through each radiant section and are later combined before entering the atmospheric tower.

The atmospheric stage has been designed for either dry distillation or the use of process steam in the base of the tower and in the stripping section. The vacuum stage has been designed for the use of process steam in the vacuum tower in order to maintain close control over the specifications of the asphalt. Inasmuch as the process steam is condensed in a barometric condenser independently of the oil vapors, corrosion is not a factor. Provision is also made for introducing the exhaust steam from the pumping equipment into a super-heater located in the convection bank of the tube still and is then used for process steam.

It is important to note that the tube still is of the latest Alco design with separate radiant sections for the atmospheric and vacuum stage with a common convection bank which gives a lower exit flue gas temperatue than would be possible if independent furnaces were used.

The vacuum tower has been designed to remove light and heavy gas oil fractions and has reflux control of the top tower temperature. This operation permits the production of asphalt to meet varying specifications, and at the same time, permits the production of a clean charging stock as an overhead product. In the event the cracking unit is shut down the distillation equipment may be operated independently, at some sacrifice in throughput caused by loss of preheat from the cracking unit. This operation, however, permits the continuous running of the distillation unit, reforming unit, treating and rerun unit, thus permitting continuity of operation at the maximum operating factor.

REFORMING UNIT

This unit has been designed to operate at various pressures. The furnace is of the radiant and convection type with a separately fired radiant soaking section to maintain close control when reforming to produce gasoline of varying octane ratings. Naphtha as received from the distillation unit is taken from intermediate storage and pumped into a naphtha flash tower to remove a small percentage of high octane straightrun gasoline. The unvaporized liquid leaving the flash tower is pumped through the convection bank of the still, thence through a radiant heating section and then to a separately fired radiant soaking section before passing through the reducing valve to the main fractionating tower. Provision is also made for removing a liquid side stream of recycle stock from the main fractionating tower so that it can be combined with the fresh charge in the base of the flash tower as a composite charging stock to the furnace. The bottoms from the fractionating tower are pumped hot to the two-stage cracking unit and combined with the recycle stock.

When not making high octane gasoline the gasoline distillate is pumped through the stabilizer tower of the two-stage cracking unit to obtain the maximum yield of motor gasoline. With this operation the reforming unit stabilizer can be used for stabilizing low endpoint straightrun gasoline. This stabilizer tower is also of sufficient capacity to permit running the gasoline recovered by absorption from the two-stage cracking unit along with the gasoline from the reforming unit, thus giving a higher volatility gasoline than would otherwise be possible.

TWO-STAGE CRACKING UNIT

This plant consists of a vapor-phase cracking coil and viscosity breaking cracking coil so that either gas oil or reduced crude can be used as charge stock.

When operating on gas oil charge stock the gas oil is combined with the bottoms from the reforming and rerun units and introduced into the main fractionating tower above the inlet from the evaporator and the entire charge is heated and partially vaporized by the ascending vapors.

This unit is of the three-coil design which gives maximum flexibility and most important of all, allows the virgin fuel to be stripped separately from the cracked fuel. The viscosity breaking coil is so designed that wide tolerances for recycle oil have been provided for as well as even heat absorption under these widely varying operating conditions. By segregating the gas oil into two grades, maximum octane can be obtained by operating at higher temperature levels than is possible when one cut, of wide boiling range, is available as charge stock.

The entire plant, where temperatures reach 500°F. or above, is constructed of special alloy steel so that undue corrosion will not take place. Ordinary steel is unsuitable for such high sulfur oils.

TREATING AND RERUN PLANT

Sulfuric acid was selected as the best treating reagent for the light products from Sterlitamak crude. No other reagent appeared to be strong enough and as cheap as sulfuric acid. The three-stage centrifugal separation plant was selected because it has proved to be the most efficient tool for preserving octane value of the gasoline treated and at the same time does not produce troublesome sludge (solid) which has proved to be a very bad product to be disposed of in most refineries.

The various stabilized raw products consisting of straightrun gasoline, high octane gasoline, and motor gasoline, are processed in the centrifugal acid treating plant. Inasmuch as the motor gasoline operation is typical, a short description of the treating of this material is offered.

Stabilized motor distillate is charged to the first stage contactor where it is intimately mixed with sludge acid from the succeeding (second) stage. The mixture then leaves the contactor and passes to the centrifuges of the first stage where an immediate separation of sludge acid from distillate is effected and the sludge acid discharged to a separator where any entrained distillate is separated.

Suction is taken from the bottom of the separator by the sludge pump and the spent acid sludge is then passed out of the system. The acid sludge on leaving the plant meets a stream of water controlled by a flow controller and a diluted mixture is pumped to an acid sludge separator where the weak acid is separated and the acid fuel oil is withdrawn. A relatively clean dilute acid is recovered and is suitable for direct pumping to an acid recovery plant. The distillate passes to the second stage contactor in which it is contacted with a sludge acid from the succeeding (third) stage.

The distillate leaving the second stage centrifuges is discharged to the third stage contactor. Strong fresh acid is metered to this contactor and, leaving the contactor, the mixture is discharged to the third stage centrifuge where separation of acid suldge from the distillate occurs again, with the sludge acid being discharged to the second stage contactor as previously described.

NEUTRALIZATION PLANT

The acid treated distillate flows through a water-washing tower where the residual acidity of the distillate is reduced before caustic neutralization. After neutralizing, the mixture enters a caustic settling tank where a separation occurs. The neutralized distillate flows to storage prior to redistillation.

RERUN PLANT

The acid treated and neutralized distillate is pumped from intermediate storage through exchangers, thence through a preheater and the mixture discharged to the atmospheric fractionating tower. The light rectified gasoline passes overhead and is condensed. The bottoms from the atmospheric tower pass through an external reboiler section and supply the necessary reboil heat at the base of the tower and it is then pumped to the vacuum tower. The overhead streams collected from the atmospheric and vacuum stages are blended and sent to intermediate storage prior to doctor sweetening.

DOCTOR SWEETENING PLANT

Two doctor sweetening plants have been provided, one plant is of sufficient capacity to handle the maximum yield of motor gasoline when the treating and rerun units are operated at full capacity. The second doctor treating plant has been designed with sufficient capacity to handle maximum yield of high octane gasoline or alternately the straightrun gasoline recovered from the topping unit, when the production of high octane gasoline is not desired. Since the remainder of the operation is typical no description is given.

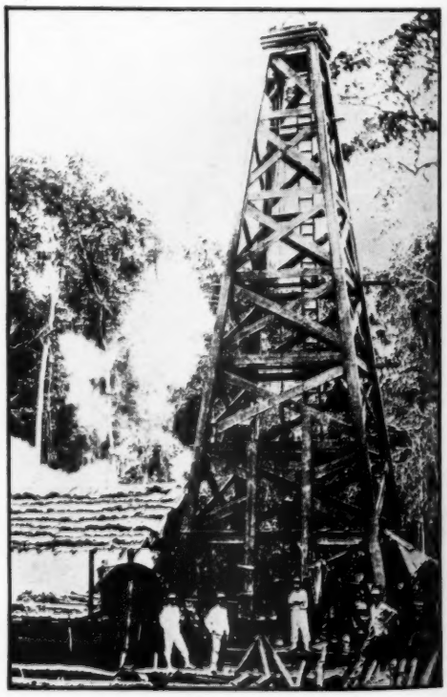
The high octane gasoline produced in this plant has an octane rating of 75 (A.S.T.M. Method). The motor gasoline produced has an octane rating of 69-70 (A.S.T.M. Method). The sulfur content of each gasoline is below one-tenth of 1 per cent, and the color is +21 Saybolt.

It is to be noted that no lead or other extraneous chemicals are added to either gasoline to produce the octane rating shown above.

The natural asphalt produced is varied in penetration from 50 to 150 (tests made at 77° F.).

The finished products from this low-grade crude are of the highest quality and may be considered a tribute to the engineering skill of the men who have had the responsibility of designing and producing such a plant.

✣

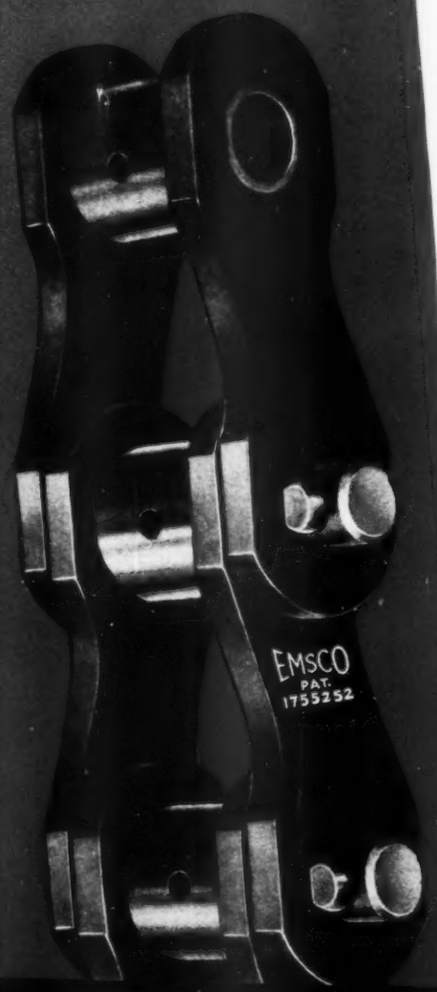


ON THE EDGE OF THE JUNGLE—*Well at Balikpapan, Borneo, on the Mahakam River.—(Underwood)*

3-B EMSCO CHROME VANADIUM

4-B EMSCO CHROME VANADIUM

3-C EMSCO GREEN PIN



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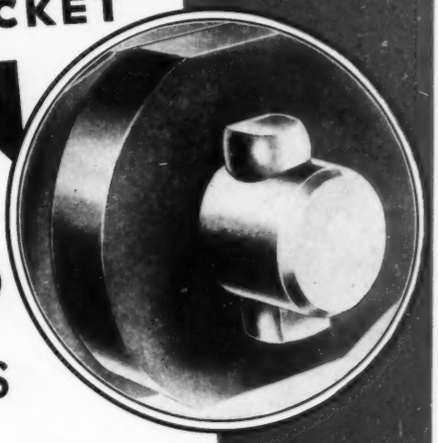
CHROME VANADIUM OIL FIELD SPROCKET CHAIN



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The new Emsco Chrome Vanadium Chain, now embodying greater strength for the deepest drilling, is the result of years of experience in the manufacture of chain solely for oil field service. Chrome Vanadium steel is used for the side bars, rollers, bushings, and chain pins; all being designed for maximum strength with close working fits of all parts, assuring uniform and parallel pitch length and long life.

Emsco Patented Locking Pins are upset at one end with the other end swedged, causing it to engage with the adjacent part of the side bar. This prevents the chain from spreading, and eliminates any possibility of pin working loose under the most severe service. The pin is easily replaced when chain is taken apart and assembled in the field.

For detailed information on Emsco 3-B, 4-B, and 3-C Chrome Vanadium Chain, ask for Bulletin No. 8-E.

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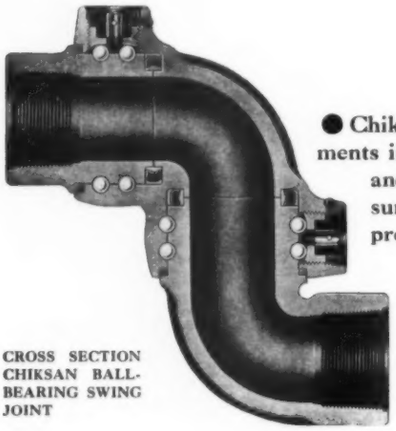

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● Chiksan Ball Bearing Joints (for both high and low pressure work) are available with swivel movements insuring free, easy, continuous turning in any desired direction. All sizes larger than 1" rotate on and are held firmly together by double rows of ball bearings which gives more stability and bearing surface to the swiveling part of the joint. No adjustments are required as the patented packing unit provides positive seal, minimum amount of friction and eliminates leakage problems.

● The light weight, simple design, high factor of safety and Proven performance insures greater ease and economy of operation for the following applications:

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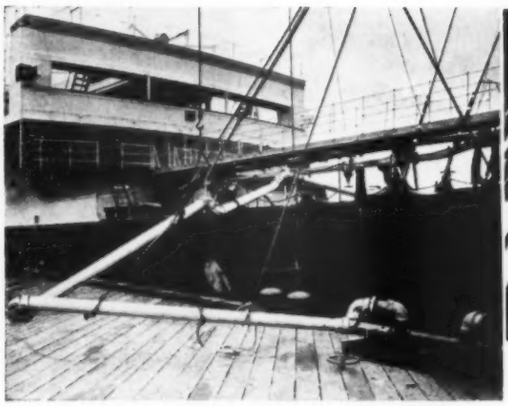
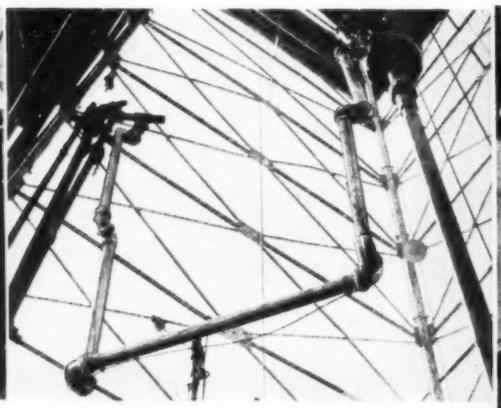
Our engineers will be glad to submit information and designs for these applications or for any other use where flexible joints are desired. Write for our New Rotary Hose folder and new Swing Joint Folder.



CHIKSAN DOCK HOSE

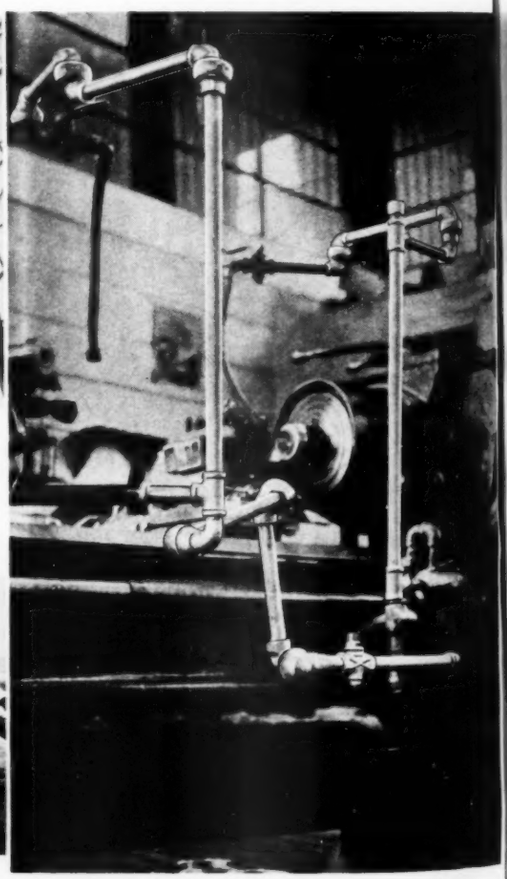
Chiksan 6 inch x 50 foot Aluminum Suction & Discharge Hose unloading casing head gasoline at 120 pounds pressure.

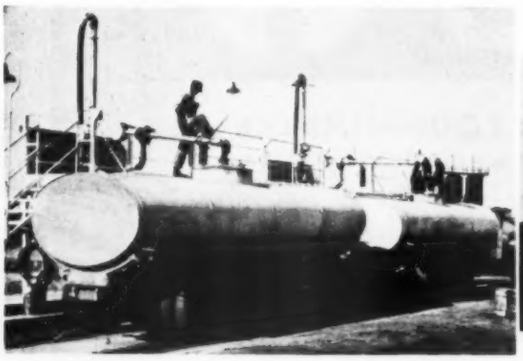


CHIKSAN ROTARY HOSE

Chiksan 4 inch All Steel Rotary Hose used for both mud control and "pressure drilling." It has a safe working pressure of 3,000 lbs. and a bursting pressure of 12,000 lbs.

Below: Installation showing 4 inch No. 30 Chiksan Swing Joint dock connections. Free swiveling without leaking means efficient operation.





CHIKSAN GASOLINE LOADING RACK

Chiksan 4 inch Aluminum Swing Joints used on loading Racks for gasoline. They greatly reduce loading time.

¾-inch Chiksan Ball Bearing Swing Joints in use on turret lathe. Also made in 1 inch size. They never leak.

Chiksan

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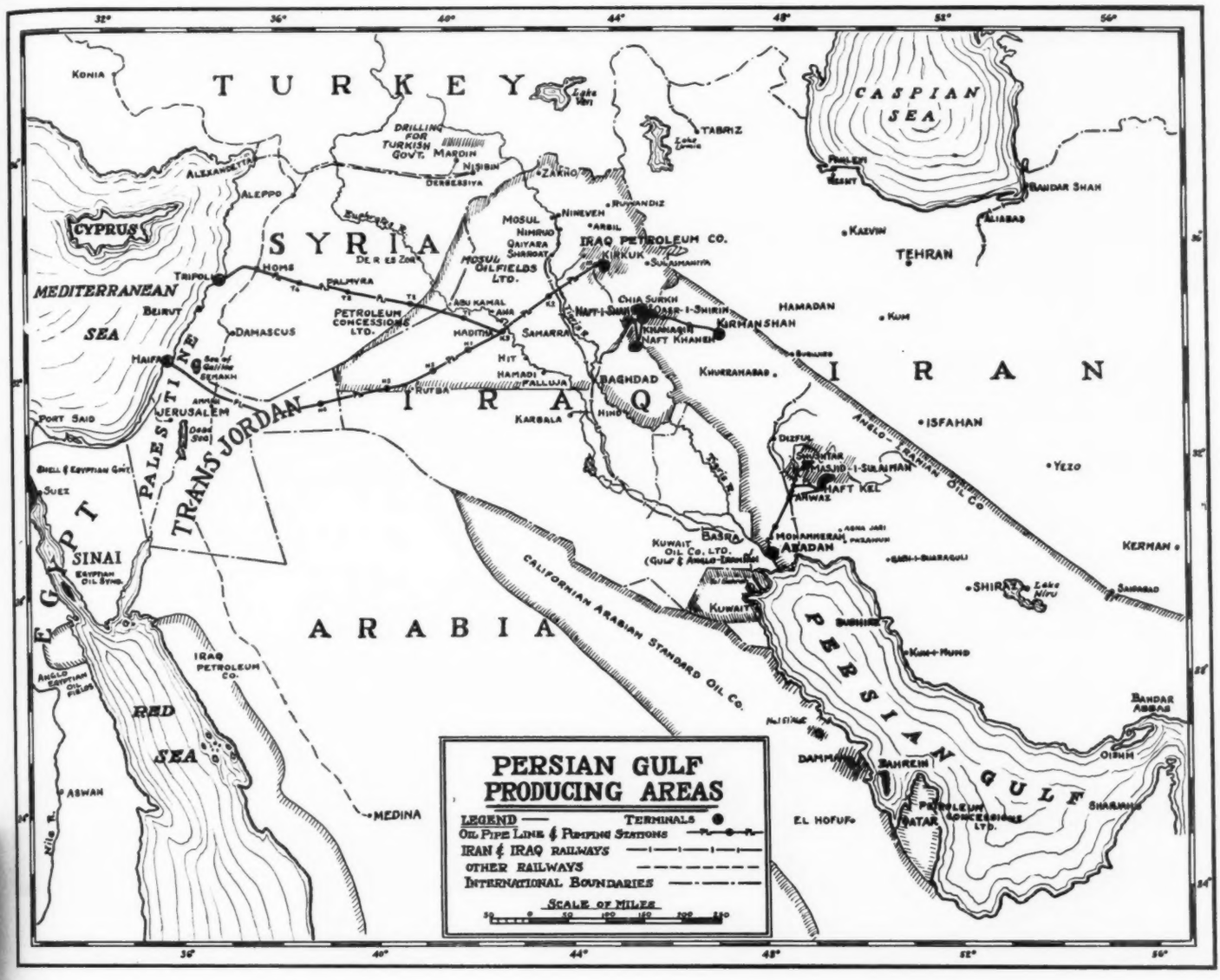


Bahrein Island and Arabian Developments

Bahrein Island's position as an important source for eastern world crude oil and refined products will reach its full significance in 1937, but probably not before July 1, the scheduled completion date for Bahrein Petroleum Co. Ltd.'s new refinery to its capacity throughput of 25,000 bbls. daily.

Although handicapped most of 1936 by complete lack of refining facilities and for a greater part of the year entirely dependent on irregularity of available tankers, Bahrein's petroleum shipments averaged approximately 10,000 bbls. daily. At the close of 1936, production from the Bahrein Petroleum Co. Ltd.'s 40 completed wells had been increased to about 12,000 bbls. daily, part of which is being refined on the island. However, Bahrein Petroleum's refinery is only partially complete and will not reach its maximum rated capacity of 25,000 bbls. until the middle of 1937. Meanwhile the operations division of the company is proceeding with a drilling program to insure uninterrupted crude supply and at the same time exploring for possible deeper pay horizons, which if present, will materially add to reserves.

Although uniform conditions of testing production on Bahrein completions have been impossible, partially due to its distance from field equipment distributing points, it is estimated that potential so far established is roughly 250,000 bbls. daily.

The main pay so far explored on Bahrein Island is a porous, brown, sugary lime zone approximately 325 feet thick, but broken and impregnated at intervals with shale. The area is considered somewhat similar to the normal West Texas Permian Basin oil field. The Bahrein Island crude likewise contains a small fraction of sulfur and yields with cracking a high quality of gasoline ranging around 68 octane without reforming. Sulfur content of the crude has not been particularly corrosive to refinery equipment and has presented no special treating problems.

Production exceeding 6,000,000 bbls. for 1937 is included in operation schedules now completed. Until the full capacity of the Bahrein refinery is available, it is probable production will not exceed 16,000 bbls. daily with a step-up to 22,000 bbls. or more daily planned for the last half of the year.

That the Bahrein structure will easily supply the projected production schedule is definitely assured. However, operators are continuing with normal drilling to the proven oil horizon from 2,000 to 2,300 feet and are taking advantage of the existing potential production margin over requirements to explore for possible deeper horizons.

One test, No. 52, is now being drilled with no definite goal. Mechanical equipment and the casing program, however, will permit drilling to 8,000 feet or deeper, if no formation definitely concluding production possibilities is encountered at a lesser depth. If the Bahrein company No. 52 is drilled to 8,000 feet or more it will be the deepest test in that part of the Persian Gulf district. There are no well logs in precedent to indicate within reasonable accuracy the depth at which basement rock may be reached. The company is also drilling No. 51, not far removed from No. 52, which will explore for production in a zone at about 3,000 feet which has been indicated in tests on the flank of structure.

Exclusive control of the Bahrein concession totaling about 100,000 acres has made possible a development program designed strictly on sound petroleum engineering principles. Wells that are drilled to the pay at 2,000 to 2,300 feet are spaced

PERSIAN GULF

3,000 feet, or approximately one to each 170 acres.

Faced with the problem of developing an outlet in an already crowded and highly competitive near and far eastern market in order to reduce Bahrein production to commercial advantage, Standard Oil Co. of California, parent of Bahrein Petroleum, entered an agreement with Texas Corp. for business east of the Suez Canal. Under the merged operations of Standard of California and Texas Corp. in eastern world business, the former secured access to a much needed marketing system previously established and the latter acquired an equally needed supply of crude oil.

Lack of refining capacity through 1936 forced continued supply of marketing outlets from American refineries of Texas Corp. and Standard of California, although all possible crude requirements for foreign plants were withdrawn from Bahrein after the new jointly owned company was formed. To serve past, present and anticipated future tanker movement of products from Bahrein, three 12-inch lines have been built 4 miles into the Persian Gulf through which boats are loaded. The three oil lines are supplemented by an 8-inch line to discharge bilge water from tankers to shore, but it may be used for loading if necessary.

Until recently, it was customary to drill Bahrein Island wells to about 1,500 feet with spudders and continue from that depth to pay levels with rotary. However, prospects for production requirements, more plentiful supplies of field equipment and greater drilling technique through the upper dense limestone have made possible rotary operation from the surface down. The soft sugary composition of limestone pay has made impossible completely satisfactory core recovery. The water zone is fairly accurately established by trial and error method and the customary practice is to drill each well to a safe sub-sea interval above the water table and complete. Inability to recover complete cores has left much to be learned of the exact pay thickness in terms of oil-bearing rock.

Operators are confident a considerable part of the 325 feet of interval between top of pay and the sub-sea completion depth is oil-bearing lime, but for lack of absolute information obtainable from complete sets of cores conventional estimates of recoverable reserves have been impossible at this stage of development.

DISCOVERIES IN ARABIA

While insignificant at present compared to Bahrein Island, the Suadi Arabian mainland opposite the island, has been proved productive of high gravity oil at two locations and may develop into an equally important or greater source of crude oil. California Arabian Standard Oil Co., operating subsidiary on the Suadi Arabia mainland, discovered production last August in its No 2 Damman which flowed at the rate of 3,800 bbls. of 53 gravity oil in 24 hours from total depth of 2,152 feet. Since August, No. 3 Damman has been proven productive, but is not finally completed. The original test on the mainland has been plugged back from total depth of 3,203 feet and operators are perforating pipe in effort to develop production at 2,100 feet. Four other tests on the Damman structure are drilling or in various stages of development and nearly 40 miles north a wildcat, No. 1 El'Alat, is drilling below 1,750 feet. Determination of the productive ability and extent of the Damman structure and others on the huge concession which flanks the Persian Gulf shoreline for nearly 75 miles is one of the major 1937 objectives.

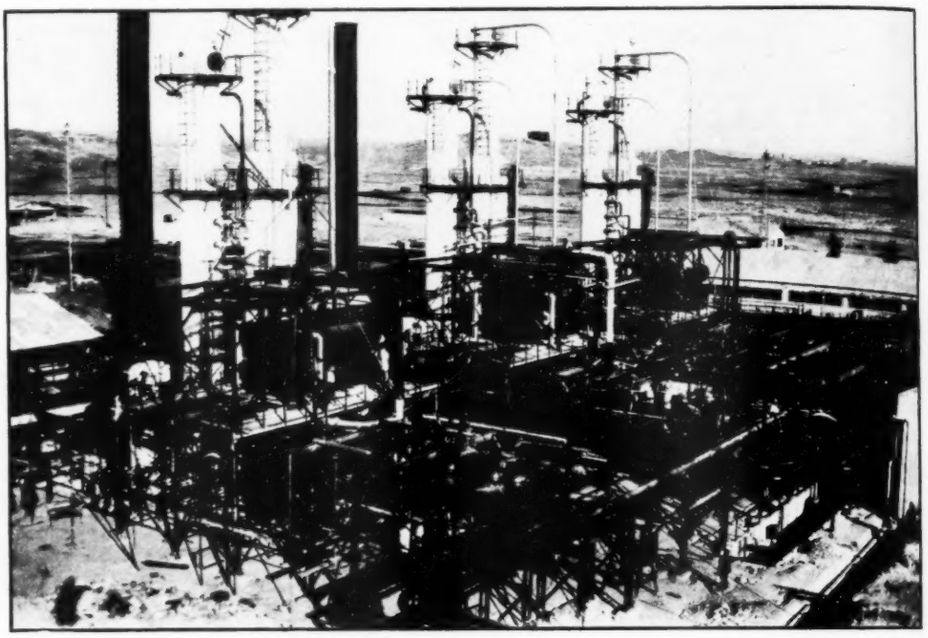
On results of the Saudi Arabian mainland exploration now under way will be based the decision to duplicate the Bahrein refinery in Arabia or double the capacity of that now nearing completion on the island. Seventeen miles of submerged land divide Bahrein Island from the Arabian mainland. If the Arabian concession proves productive in quantities justifying the expenditure, the management has signified a preferance for erecting a refinery on the mainland.

KOWAIT WILDCAT

One of the Persian Gulf district's most interesting wildcat tests now drilling is that in Kowait, approximately 50 miles north of California Arabian Standard No. 1 El'Alat, which is now drilling around 5,700 feet. The Kowait test is a joint project being drilled by Gulf Oil Corp. and Anglo-Iranian Oil Co., Ltd. Success at Bahrein and on the Arabian mainland resulted in purchase by various interests of all other available concessions in 1936 along the Persian Gulf shoreline. Much of the land had been acquired previously, but practically all since has been removed from the open market. Petroleum Concessions, Ltd., an organization established by Iraq Petroleum Co., Ltd., was particularly active in acquisition of concessions in the Saudi Arabian mainland during 1936. The practice of assigning various parcels of land to separate operating units has been followed consistently by Petroleum Concessions.

The peninsula of Qatar, a short distance east of Bahrein Island, was assigned by Anglo-Iranian Oil Co., Ltd., to Petroleum Concessions and later Petroleum Development (Qatar) Ltd., was organized and registered in London for the purpose of "dealing in leases, options, rights or working of any lands." Proximity of Qatar to Bahrein and to the Saudi Arabian mainland production has advanced the possibility that the peninsula will be explored in the near future.

Another offshoot of Iraq Petroleum Co. organized in 1936 is Petroleum Development (Trucial Coast) Ltd., which acquired concession on various places along the coast running from Bahrein and Qatar along the southern shore of the Persian Gulf to the Strait of Ormuz.



New Foster-Wheeler crude-stabilization unit in Kirkuk field, Iraq. Capacity in excess of 100,000 bbls daily. Crude is stabilized before being tendered to Iraq pipe line

Crude Production in Iraq

85,863 Bbls. Daily

Iraq's position as the eighth ranking country in crude oil production was strengthened appreciably in 1936 without benefit of new fields, although existence of productive structures other than those actually drawn upon is a certain conclusion.

Production from Iraq, rounding out the second full year in which world marketing channels were open to operators in that country, will be approximately 29,500,000 to 30,000,000 bbls. when final

IRAQ

figures are compiled. At the end of 10 months, the country had produced 26,002,475 bbls., or a daily average of 85,863 bbls.

Iraq's fields fluctuated in production from day to day, but generally ranged around 2,450,000 bbls. per month. Final figures for 1935 showed production of about 27,014,904 bbls., indicating this year's output will run approximately 3,000,000 bbls. over the previous record yield.

Iraq Petroleum Co., Ltd., which controls most of Iraq crude oil production, continued with its systematic exploration and production policies in the Kirkuk field. In view of the unit control of Kirkuk pool, Iraq Petroleum Co. is permitted to practice the most advanced production methods and to experiment with theories, many of which have proven beneficial. The bottom-hole pressure differentials and low gas oil ratios have been maintained to a remarkable degree. The company is able to regulate reservoir pressure and drainage with almost caliper accuracy under the program of operations. As in the past, all production withdrawn from the Kirkuk field in 1936 was produced by flowing and the practically negligible pressure decline presages an indefinite flowing life for the area.

Spacing, commensurate with producing horizon conditions including full and adequate drainage, permeability and porosity, is the general policy to eliminate drilling of unnecessary wells and thereby to reduce the overall development cost.

Khanaqin Oil Co., Ltd., subsidiary of Anglo-Iranian Oil Co., continued to operate its Naft

SO SIMPLE —yet so Tight!

..joining pipe with Dresser Couplings!

Here's photographic proof of the extreme *simplicity* of installing a Dresser Coupling. This series of pictures shows clearly—step by step—that the Dresser joint is simply assembled—*not fabricated*—in the field. Only one tool is required—a wrench. RESULT: *A flexible joint, permanently tight!* Dresser Couplings are available for all kinds and sizes of plain-end pipe, from ⅜" to the largest diameter made. *Write for descriptive folder No. 355.*

S. R. DRESSER MANUFACTURING CO., BRADFORD, PA.
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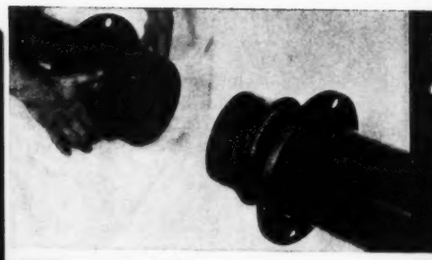
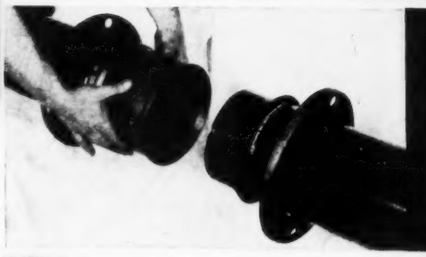
DRESSER COUPLINGS



1. Place one follower, then one gasket on each pipe end, about six inches from the end of the pipe.



2. Shove middle ring over end of laid section of pipe until pipe stop or center bead on inside of middle ring comes up against the pipe end.

3. Stab other pipe end into middle ring until it reaches pipe stop.

4. Slide gaskets and followers up to and against middle ring, making sure gaskets are pushed under middle-ring flares uniformly at all points.

5. Insert bolts, and run up nuts to finger tightness.

6. Draw up nuts to final tightness with ratchet wrench, pulling up diametrically opposite bolts evenly and by progressive stages.

Khaneh pool near the Iranian (Persian) border to supply the Iraq local market through Rafidain Oil Co., Ltd. The pool is producing a comparatively small amount of oil, but is drawn upon only to the extent of Iraq's local market. Practically all of the country's crude oil production is moved via the Iraq Pipe Line Co. system to the ports of Tripoli or Haifa.

In addition to any increased production in 1937 and the last few weeks of 1936 which may be justified by higher world consumption, Iraq crude may enjoy a greater demand in years to come by virtue of the recently completed crude stabilization system. Iraq crude of 36.0 A.P.I. gravity has not been particularly popular due to sulfur content of the order of 2 per cent. Caustic soda treatment at deep sea terminals proved inadequate in neutralizing the crude's natural sulfur content. Objections by residents at French and English refining centers over plant odors while processing crude from Iraq were a constant source of difficulty to the operators. In addition, the corrosion toll on refinery vessels and tankers was a constant expense item of considerable proportions.

In an effort to solve permanently the sulfur problem, Iraq Petroleum Co. constructed a crude stabilization plant at the field end of its pipe line. The stabilization plant was completed and placed in operation last September, but full details of operating results have not been released. The plant is designed to handle up to 100,000 bbls. of crude daily and consists of three units. The crude is subjected to low temperature, just sufficient to drive off fixed gases, including hydrogen sulfide. The crude is then subjected to a light chemical treatment practically completing the removal of H_2S. Butanes are mostly retained in driving off methane-ethane and propane from the Iraq crude. The light yield of gasoline obtained by the low temperature heating and condensation process is stabilized in the second stage column and then returned to crude lines. It is also a part of Iraq Petroleum Co. operating technique to degas the crude, returning the gas in excess of fuel requirements to the producing horizon, which contributes in a measure to almost negligible pressure declines in the producing operations.

STABILIZATION PLANT

The crude stabilization plant, built for the sole purpose of removing objectionable gases and constituents of the crude, is the largest of its type in the world. It lacks the operating range of some of the plants built for somewhat similar purposes in this country, but is capable of handling a much larger volume throughout.

Routine exploration continued this year on Mosul Oilfields, Ltd., concession, west of the Tigris River in Iraq and covering 46,000 square miles compared to Iraq Petroleum Co. 32,000-square-mile plot. Results so far obtained have apparently not justified construction of an outlet for the crude. Operations have been carried on quietly during the year, but there are rumors freely circulated that a better quality of crude has been developed than previously obtained.

Probably the year's most important development in Mosul Oilfields, Ltd., was disposal of the Italian company's interests to Petroleum Concessions, Ltd. The Italian interest in Mosul Oilfields, Ltd., was held by Azienda Generale Italiana Petroli, controlled by the government. The sale of the Italian owned interest in Mosul Oilfields was officially confirmed in August, although the deal was originated and for all intents and purposes was closed several weeks before formal announcement. British Oilfield Development, Ltd., operating unit of the Mosul Oilfields, Ltd., rated its development program between 9 and 16 rigs. The minimum number of operating rigs required under terms of the concession contract is nine. Extension of the Qaiyarah-Nejmah-Jawan field to include also the Qasab area has been accomplished and while the production ranges around 20° A.P.I., the pool appears to have been definitely proved of commercial caliber. Production has been found in the Eo-Cretaceous as well as in Eocene, Oligocene and Lower Miocene. The Sadid and Hibbarah areas, while each qualified for production with one producing well, remain to be proven of commercial importance.

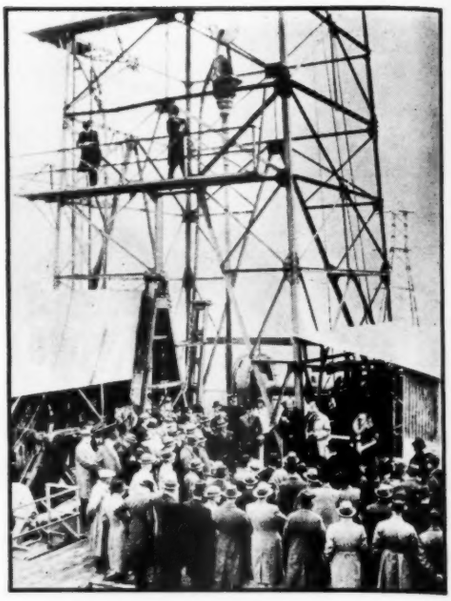
Mosul Oilfields, Ltd., concession remains handicapped by lack of a crude outlet. Rumors were heard during the year of plans to build a pipe line to Alexandretta and that the Anatolian Railway would be extended from the Turkish border to Mosul, but nothing tangible has developed.

Preference for Rumanians in Oil Field Areas

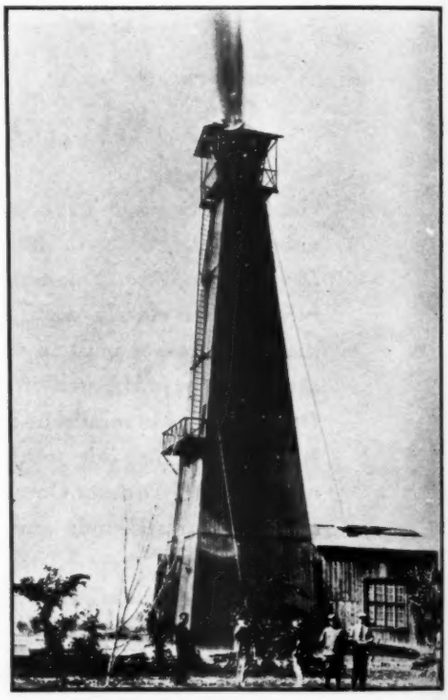
Preference in selection of acreage for future exploration has been extended by the Rumanian government to its national companies, leaving foreign concerns more or less dependent on secondary areas for future reserves. The concentrated action to bring all Rumanian oil interests under government control through a licensing system for refining is another factor disturbing to foreign capital invested in Roumanian petroleum enterprises.

The problem of obtaining sound exchange for its petroleum products was probably the chief stumbling block in Rumania's oil business during the year. The willingness of Germany to absorb heavy quantities of Roumanian crude oil and paying for it in manufactured materials was a factor occupying full interest of Rumanian governmental officials and the country's bankers.

Although restrictions on issuance of exploration parimeters were released to some extent during the middle of 1936 preferential rights reserved for nationals, if they are able to prove ability to finance and proceed with primary and secondary testing, placed a handicap on foreign companies. Even under the more liberal regulations areas obtainable from the state in solid tracts are limited to 4,000 hectares and a selection of 1,000 hectares must be made from the total. Irrespective of the hardships imposed, several wildcat areas were drilled or in process of exploration in 1936 in the so-called plains area mostly west of Ploesti and east of Targoviste. None of the completed projects have been outstandingly successful, but sufficient encouragement has been given to indicate continuance of the wildcat drilling program over most of 1937. Lack of new reserves in Rumania—only two new fields having been discovered since the world war—probably will spur the search for new production in the near future.



BRITAIN SEEKS OIL—*Well at Paulsgrove, near Plymouth, England.—(International)*



OIL DISCOVERY IN ITALY—*This well was at Fontevivo.—(Underwood)*

Talara, Peru, refinery of International Petroleum Co., Ltd.

SALES
CONCESSIONAIRES
IN GREAT BRITAIN
THE MANNESMANN
TRADING Co. LTD.
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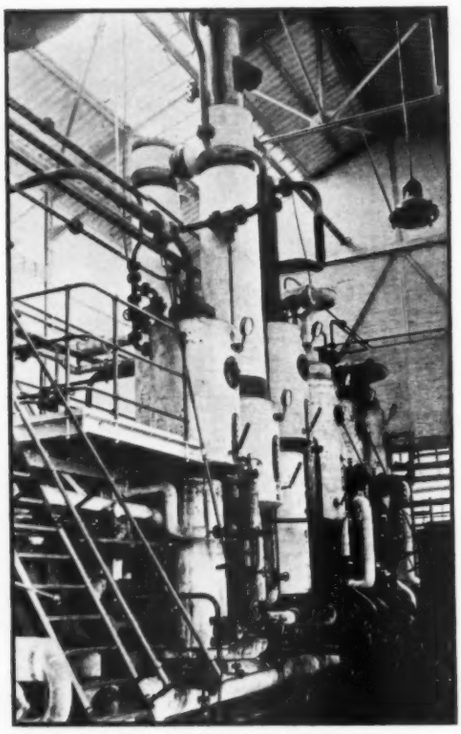
Flexible Treating Process and New Cracking Unit in France

Societe Generale des Huiles de Petrole, one of the larger refinery operators in France during the past year completed the installation of a 2,000-bbl. cracking unit and has also operated successfully a Benzol SO_2 treating plant at its Courchelettes, plant in France.

The Benzol-SO_2 plant has a charging capacity of 400 bbls. a day of heavy lube stock. The plant is used for treating a number of stocks ranging from kerosenes, turbine and transformer oils to heavy lubes of 240 Saybolt seconds viscosity at 210° F. This unique flexibility is a characteristic feature of the combination plants, which permit of treating either with SO_2 alone or with the more powerful mixture of benzol and SO_2, whereby additionally the ratio of the solvent aid benzol can easily be varied and adjusted for each individual stock.



Benzol-SO_2 treating plant at Courchelettes, France, refinery of Societe Generale des Huiles Petrole

The extraction system of the Courchelettes plant consists of a true counter-current mixer for kerosenes and light lube oils and of a conventional four-stage counter-current mixing-settling unit for the heavier lubes. This lube extraction system is equipped with means of adjusting the temperature in the various stages, so that a temperature gradient may be maintained between the first and second stage, thus effecting a rejection of raffinate-like oil components from the extract. As an alternate, an even temperature gradient may be maintained from stage to stage throughout the extraction unit. In either case the temperature drop towards the final extract settling stage has a marked effect on the yield of raffinate.

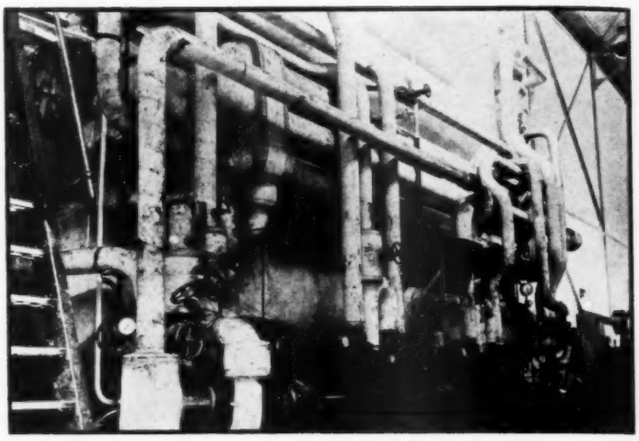
The loss of solvent is negligible in this plant. In the recovery systems for the raffinate and extract the benzol is recovered completely from the oil by means of stripping the latter with pure SO_2 gas under about atmospheric pressure. The traces of SO_2 thereby remaining in the oil are readily removed in a succeeding vacuum stage by simple flash distillation. Although both solvents are very cheap, a complete removal from the oil especially of the benzol is imperative, as traces of this solvent would depress the flashpoint of the finished product.

Equally important is the control of the water concentration of the solvent which readily absorbs the water carried into the plant with the feedstock. In this plant the solvent is most efficiently dried in continuous operation by fractionating part of the solvent vapors flashed off from the extract under pressure. These vapors carry most of the water in the solvent cycle and very little benzol. SO_2 reflux is applied for retaining the water and benzol in the fractionating column which is thus furnishing bottoms consisting of water with some benzol. The latter is readily recovered by decantation. The same fractionating column serves for adjusting the benzol concentration of the treating solution.

An interesting mechanical feature is the device for observation of the interphases in the various settlers. For this purpose Edeleanu developed an electrical indicator operating on the principle of conductivity. Since there are always traces of water present in the SO_2, the bulk of which goes into the extract, the location of the interphase between extract and raffinate is readily indicated by means of a set of neon lights. This feature proved a full success. It is especially valuable for treating waxy stocks which do not permit of using the conventional observation windows in the settlers.

During the 13 months of operation the plant has met all requirements under the most severe operating conditions as created by the frequent change of the feed stocks.

The accompanying photographs show part of the extraction system, with the settlers arranged one above the other. In the center is the tableau for the neon light interphase indicators. The other photograph illustrates part of the solvent recovery system.



Heat exchangers of Benzol-SO_2 treating plant

CRACKING UNIT

This cracking unit, which has been in commercial operation since May of this year, was designed primarily to process simultaneously 1,400 bbls. per stream day of 47 to 62° A.P.I. naphtha and 600 bbls. per stream day of 24 to 26° A.P.I. wax distillate, both from Persian crude oil.

The unit, in addition to charging the above mixtures, is capable of operating on either of these two stocks alone and produces stabilized gasoline and low cold test fuel oil. Provision has been made (when operating on wax distillate alone) for withdrawing a stream of cracked gas oil as a final product.

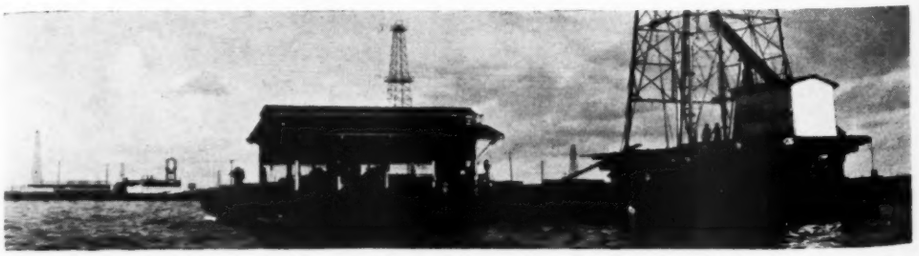
The flow through the plant when operating on both naphtha and wax distillate follows.

The two stocks, entering the unit as fresh feed, are mixed and as one stream are preheated first in a top tray reflux exchanger; then in a partial condenser before joining the recycle gas oil stream coming from the base of the bubble tower and entering the single coil furnace.

The combined stream leaving the furnace enters the base of the evaporator tower. The bottoms from this tower are flashed at reduced pressure in a fuel oil flash tower, resulting in a fuel oil as a bottoms product, which is cooled and stored, and an overhead distillate which is returned to the bubble tower. Vapors leaving the top of the evaporator pass through the partial condenser before entering the bubble tower. From there the gasoline overhead is sent to a stabilizer and then stored as a finished product.

A side stream fraction from the bubble tower is stripped in a separate column, cooled and stored, if the gas oil cut mentioned above is to be produced. Fixed gases resulting from the operation are released from the high pressure gas separator and the stabilizer reflux drum to the refinery gas main.

Careful design, especially in connection with heat exchange equipment, has resulted in a compact installation which at the same time is easy to operate, capable of long service and economically efficient. The cracking unit is the Cross type.



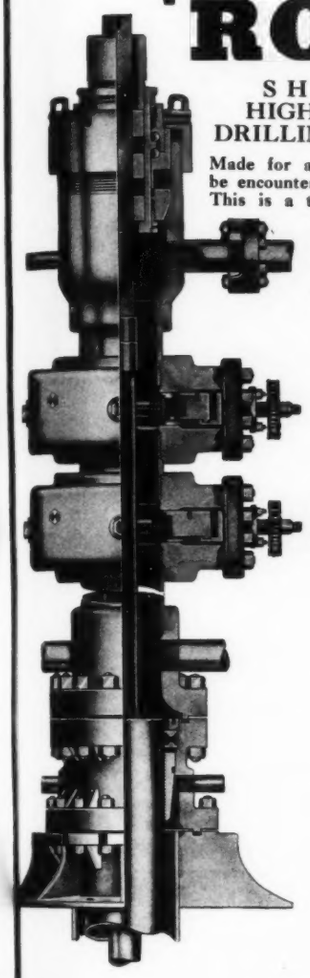
Venezuela Gulf Oil Co. cleanout barge

SHAFFER

'ROUND THE WORLD

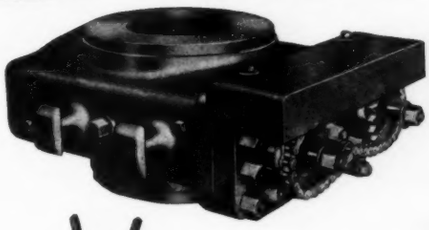
SHAFFER HIGH PRESSURE DRILLING HOOK-UPS

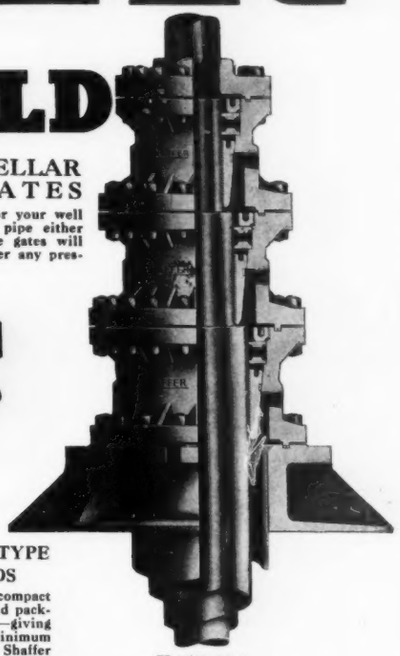
Made for any pressure that may be encountered in modern drilling. This is a typical installation but we can make Hook-ups to any specification to meet your special needs. Recommendations gladly furnished.



SHAFFER CELLAR CONTROL GATES

Provide positive protection for your well against blow-outs with drill pipe either in or out of the hole. These gates will positively close and hold under any pressure indefinitely.





CLASS "A"
Tested to 3,000 Pounds Per Square Inch

SHAFFER SPOOL TYPE LANDING HEADS

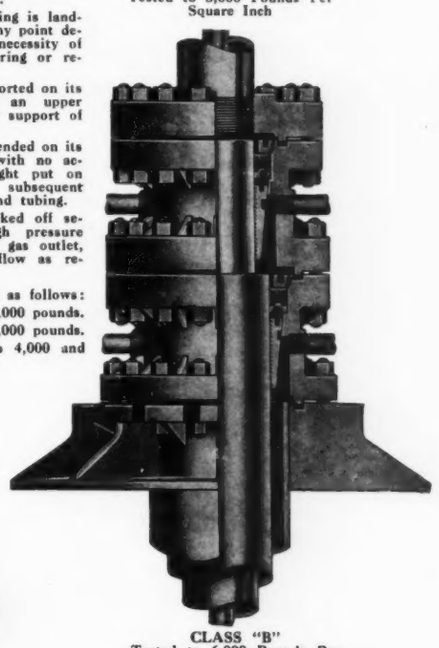
The simplest and most compact landing head for landing and packing off strings of casing—giving maximum safety with minimum cellar space. Only in the Shaffer Spool Type Landing Heads can you get these features:

1. Each individual string is landed with safety at any point desired without the necessity of "letting-go," measuring or re-threading.
2. Each string is supported on its own flange with an upper flange provided for support of the next string.
3. Each string is suspended on its own set of slips with no accumulation of weight put on those slips by subsequent strings of casing and tubing.
4. Each string is packed off securely against high pressure with provision for gas outlet, mud line or overflow as required.

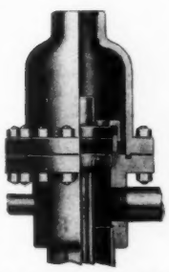
Made in three classes as follows:
Class A—Tested to 3,000 pounds.
Class B—Tested to 6,000 pounds.
Class MB—Tested to 4,000 and 5,000 pounds.

SHAFFER CELLAR CONTROL GATES WITH REMOTE CONTROL

Two Remote Control features absolutely guarantee the closing of Shaffer Gates. The Pelton Wheel for use with power and the Hand Wheel for manual operation permit the Gates to be closed from outside the derrick.



CLASS "B"
Tested to 6,000 Pounds Per Square Inch

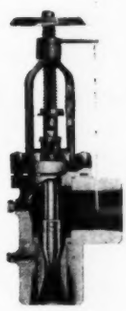


WARREN CONTROL HEADS

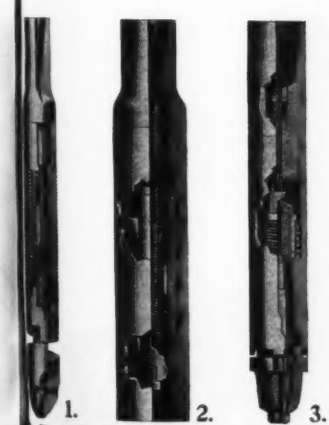
Warren Control Heads provide the means for packing off drill pipe, casing or tubing in the hole whenever there is a threatened blowout and for making connections for a shut-off or to a production hook-up with the well under complete control.

SHAFFER UNIVERSAL TUBING CONTROL HEADS

A simple, compact unit serving as a blowout preventer while drilling in and tubing a well. Used in conjunction with the Shaffer Tubing Flow Control Valve at the bottom of the tubing.



Type 34



1. Shaffer-Hamon Releasing Spears

Recommended for removing casing or pipe, or setting liners, for holding jobs or for left-handed jobs and for use with any type of rotary jar. Shaffer-Hamon type (illustrated) for right hand work and Shaffer T. & T. type for left hand work.

2. Shaffer-Hamon Rotary Releasing Sockets

Recommended for recovering drill pipe, casing, liners, tubing or any other type fish for which a socket may be used. Shaffer-Hamon type (illustrated) for right hand work and Shaffer T. & T. type for left hand work.

3. Shaffer Expanding Pin Taps

Used in left-handing or backing-off strings of drill pipe "stuck" in tight holes when a tool joint box or coupling is up. Screws into the thing like any ordinary tool joint. The only tool of its kind.

FOR DETAILED DESCRIPTION OF THE SHAFFER LINE SEE OUR SECTION IN THE 1937 COMPOSITE CATALOG

SHAFFER
TOOL WORKS

SPECIALISTS IN HIGH PRESSURE DRILLING & CONTROL EQUIPMENT
FISHING TOOLS THAT EXCEL

BREA, CALIFORNIA — HOUSTON, TEXAS
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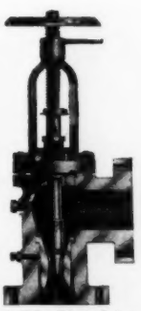

A.P.I. Ring Joint Flanges with Micro Tips

SHAFFER ADJUSTABLE FLOW BEANS

All Shaffer Adjustable Flow Beans are furnished with our patented Venturi Tube which allows the fluid to flow smoothly and with minimum turbulence or tendency to emulsify. Made in many types. There is a Shaffer Adjustable Flow Bean to meet your every need.

SHAFFER ADJUSTABLE FLOW BEANS WITH A.P.I. RING JOINT FLANGES

Flanged yoke provides easy removal for renewing tip or backing out insert without disconnecting tee from flow lines. A.P.I. Ring Joint Flanges enables production hook-ups to be built in less than half the time heretofore required. Eliminates the danger from poorly cut and leaky threads.

Dependable POWER CONTROL

For Oil Field Service

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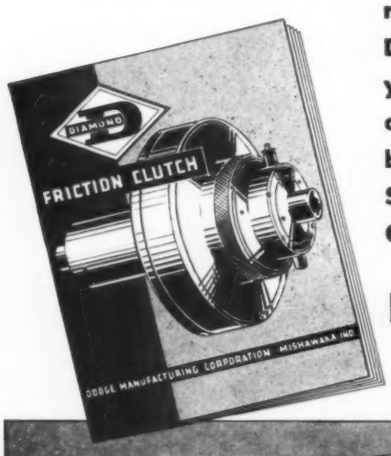

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Refinery Expansion Programs Nearing Completion in Italy

Efforts to establish its independence from the remainder of the world for its petroleum supplies were pushed vigorously throughout 1936 by Italy. However, restrictions on oil trade with Italy were modified materially during the year in the form of three reductions in import duties, which stimulated internal consumption and attracted additional refinery construction on native soil.

Although 1936 petroleum consumption by Italy was above previous normal years, it was considerably below 1935 demand when the conquest of Ethiopa was under way. Italian petroleum consumption reached a peak which will not soon be surpassed, except in event of further military projects, during 1935. However, expansion of motor units at home and exploration of Italian East Africa (Ethiopa) probably will keep the nation in the list of increasing petroleum consumers for some time to come.

Water tube boilers and power plant

One of Europe's largest 1936 refineries was started during the year under supervision of Moore & George, Ltd., London, for Aquila S. A., Tecnico-Industriale, a government-licensed refining company at Trieste, Italy. The refinery is scheduled for completion in January and will feature an Edeleanu combined solvent refining and dewaxing unit. The Aquila operation program calls for production of high grade solvent refined and dewaxed lubricants, turbine oils, white oils and transformer oils.

The Aquila plant will have capacity of 6,000 bbls. of crude daily. It occupies a tract of about 400,000 square meters in the Trieste Bay industrial zone, between Zaule and Muggia. Included in the building program is the company's own dock where tankers drawing up to 35 feet of water may be handled. Another dock for barge and lighter traffic is being constructed on the water frontage. The company expects to supply fuel and diesel oil to several Italian shipping lines through its wharving system.

Furnaces and tower foundation for distillation equipment

Only a part of the power required at the Aquila refinery will be supplied from plant sources. Most of the pumps will be electrically driven, but a large steam generating unit is being built to take care of refinery requirements for heat exchange, stripping and other functions.

From the oil jetty at Aquila refinery

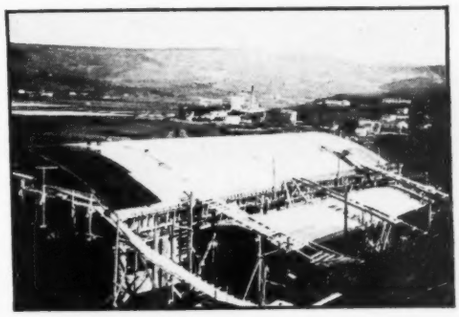
Raffineria di Napoli (Socony-Vacuum) at Naples is also launched on an improvement program which will be completed during the middle of 1937. The company is making changes in its distillation equipment and is installing a solvent refining and dewaxing system. A Duo-sol plant, capacity 1,000 bbls. daily is being installed. Only slight changes and variations in the previously existing combination skimming and cracking facilities at the Naples refinery were needed to incorporate the solvent equipment in a compact unit. Plans call for completion of the solvent unit by the middle of April, 1937.

In addition to new construction on Italian petroleum refineries launched during 1936, foundation was laid for expansion of hydrogenation. Azienda Nazionale Idrogenazione Combustibili, a new company, was organized during the latter part of 1936. Using the Montecatini Co., a firm specializing in development of chemicals, as a nucleus, the Italian government joined in creating the A. N. I. C. Later, the International Hydrogenation Patent group, including Standard Oil Co. (New Jersey) and Royal Dutch-Shell, joined with A. N. I. C. and plans are being completed for construction of plants at Leghorn, Bari and in Valdarno, province of Florence, where abundant reserves of lignitic and bituminic shale deposits exist. The Bari plant is to operate on heavy crude from Albania produced in the Kucciova field, moved to the Albanian coast through an 85-kilometer pipe line and via tankers from Valona to Bari.

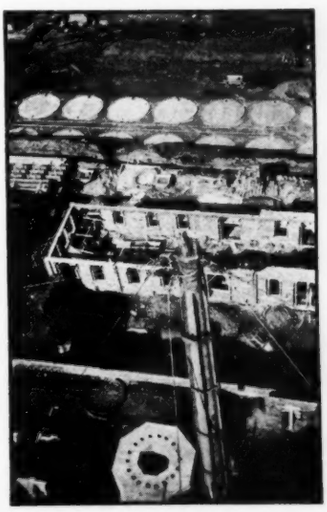
ITALY

In the matter of developing its own petroleum supply, significance is attached to the appointment of Dr. Arnaldo Petretti as vice governor general of Italian East Africa (Ethiopia). Dr. Petretti, formerly vice president of Azienda Generale Italiana Petroli and a member of the Supreme Mining Council in Italy, has assumed his duties with headquarters at Addis Ababa. It is generally understood that Dr. Petretti's first interest in Italian East Africa will be the preliminary exploration for petroleum deposits.

The search for oil will have to be preceded by the procuring of accurate data of a general character, owing to the lack of topographical and geological charts. There is being formed under the general government of Italian East Africa: (a) a corporative technical inspectorate to advise the local governments and private enterprises, for the protection and regulation of operations and for statistical purposes; (b) a geological office; (c) a chemical laboratory. A colonial mining council will have general supervision. To coordinate the activities with those in Italy, the colonial minister will avail himself of the various competent bodies. Industrial policy will have the following three essential aims: (a) to develop agriculture, mining, and trading; (b) to supply the requirements of the home country; (c) to open up relations with abroad, enlarging the possibilities of disposing of the local production. Semistate and private enterprise will be given every encouragement. The whole activity will be coordinated and controlled by the state, to avoid duplication, interference, errors and speculation. The colonial ministry is empowered to name a committee on industrial activity.



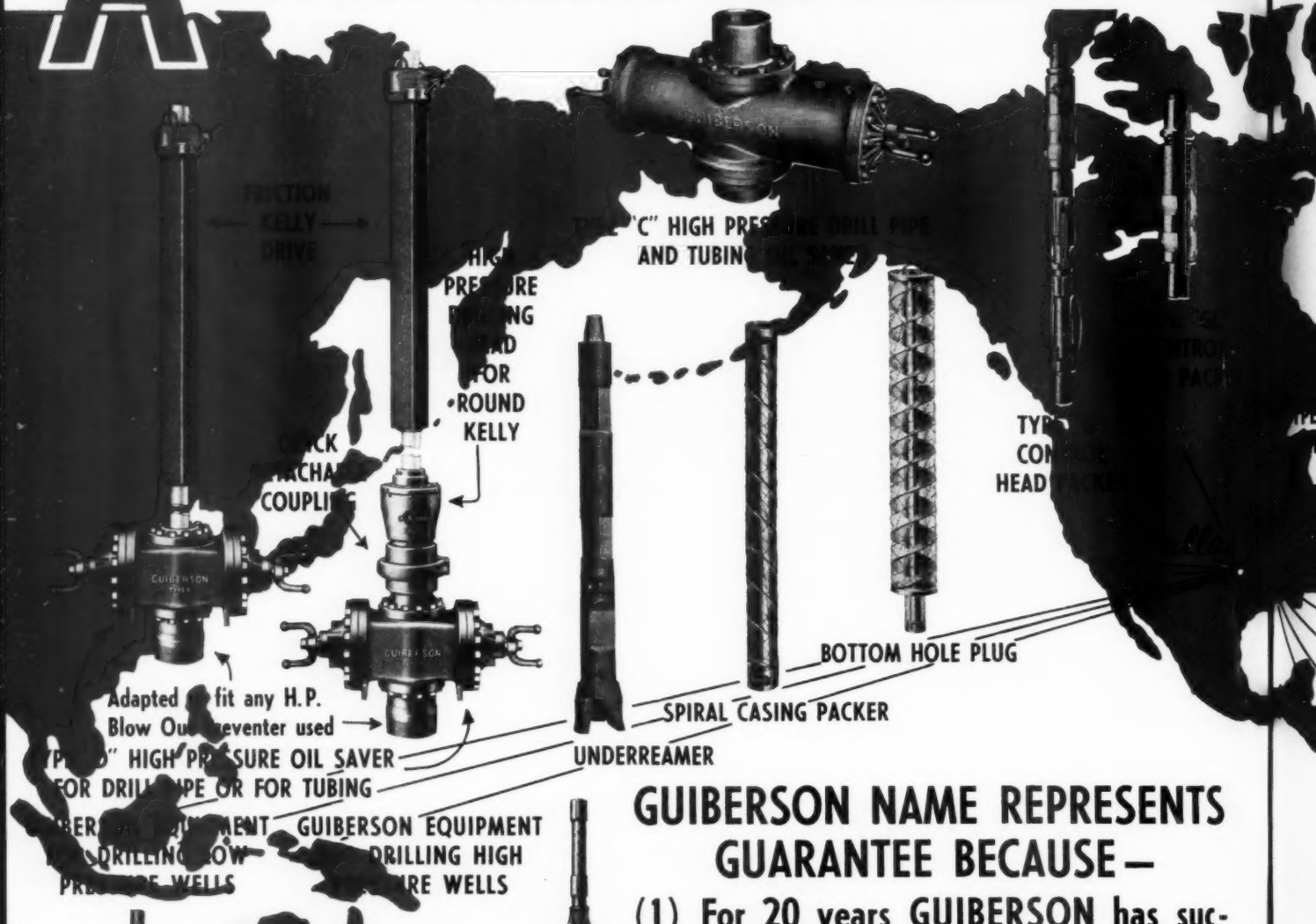
Combined solvent extraction and dewaxing plant will be housed in this building

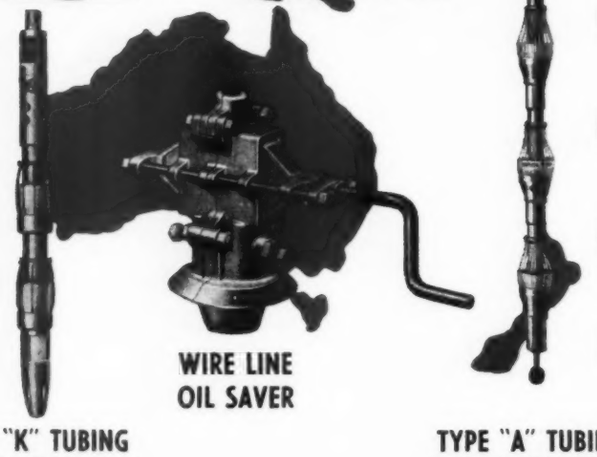


Refinery site from fractionating tower

Asfalti, Bitumi, Catrami, e Derivati (A.B.C.D.), which works the asphaltic rocks at Ragusa, has had its authorized production, to be consumed in Italy, increased to 5,000 tons of petrol, 1,000 tons of kerosene, 3,000 tons of white spirit, 2,000 tons of gas oil, 5,000 tons of lubricants, 5,000 tons of bitumen, and 5,000 tons of fuel oil.

AMBASSADORS O





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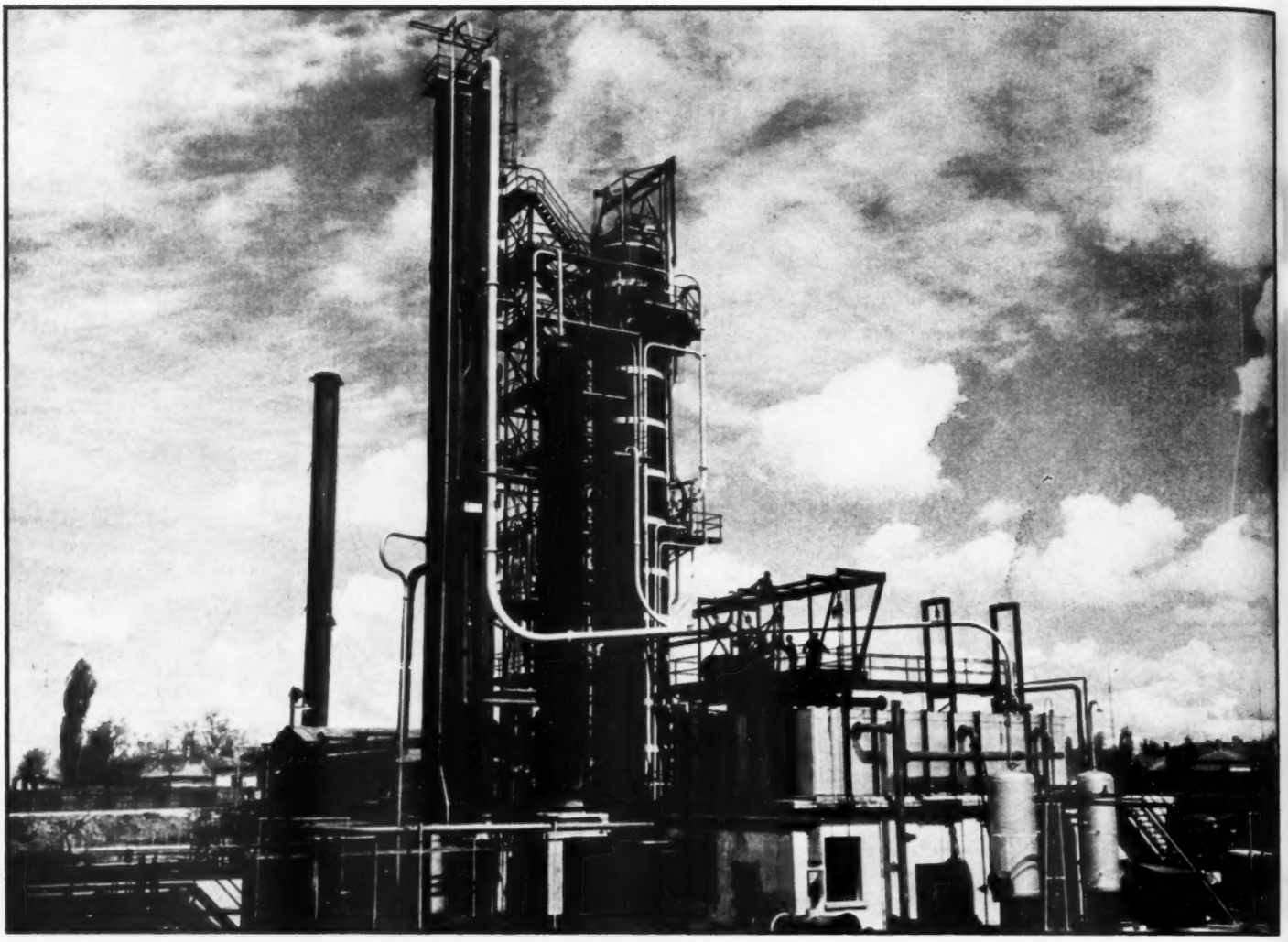

Petrolul Bucuresti S. A. refinery

New Type Two-Stage Vacuum Unit at Bucuresti Refinery

Rafinaria "Petrolul Bucuresti," S.A., recently placed in operation a two-stage vacuum crude unit at its Bucharest, Rumania, refinery. The unit is so designed that with the addition of another furnace and a reaction chamber, it can be converted into a combination crude and two-coil cracking unit. The unit which was installed by Arthur G. McKee & Co., was designed so that furnace tubes, fractionating column, condensers, valves and fittings would be suitable for a Dubbs cracking operation. The unit has a rated capacity of 3,600 bbls. (500 tons) daily.

The unit consists of a double ended furnace. The crude end has roof and floor tubes and the vacuum end only roof tubes, provisions being made for adding floor tubes on conversion to cracking. The convection bank in the center of the furnace is used for preheating the crude. The crude charge is split in two equal streams and enters the bottom of convection bank which is divided vertically in equal halves. One of the streams of oil leaving the top of the convection bank passes through the roof tubes and the other through the floor tubes, the two streams being united at the furnace outlet into one stream which is discharged into the fractionating column.

TYPICAL YIELDS AND PRODUCTS

Product	Wt. % Yield	Sp. G.		
Atmospheric Unit				
Product→			I.B.P. °F.	F.B.P. °F.
Lt. benzine	5.10	0.6960	93	273
Med. benzine	10.99	0.7380	151	273
Hy. benzine	4.30	0.7783	255	322
White spirit	9.65	0.7980	293	383
Kerosene	5.75	0.8260	325	446
Gas oil No. 1	19.84	0.8850	453	640
Total O.H.	55.63			
Vacuum Unit				
Gas Oil No. 2	0.35	0.9000	468° F. I.B.P.	572°F. @ 78%
Lt. lube	15.19	0.9360	Fl. 392°F. Visc.	°E./122°F. 5.5
Hy. lube	5.17	0.9475	Fl. 482°F. Visc.	°E./212°F. 3.0
Asphalt	15.20		81/90°F. R & B.	
Burned and loss	8.46			

RUMANIA

The crude oil pumped by the cold crude charge pump is first preheated by exchange with the overhead vapors from the fractionating column and then by exchange with the fractionating column residuum. After preheating, it passes through a salt settling drum and then into a preflash fractionating column which produces a light gasoline overhead. The hot oil charge pump takes suction from the bottom of the preflash column and pumps the oil through the furnace and to the fractionating column as described.

Six fractions are taken from the crude fractionating column consisting of an overhead cut of medium gasoline, four side cuts which are naphtha, white spirits, kerosene and gas oil and the bottoms which furnish the vacuum still charge.

The bottoms from the fractionating column are picked up by a hot oil pump and pumped through the residuum heat exchanger and then through the vacuum side of the heating furnace. About half the flash steam is put into the tubes before the oil leaves the furnace. After the oil enters the vacuum column the balance of the steam is added in the flash section. The reflux condenser is built

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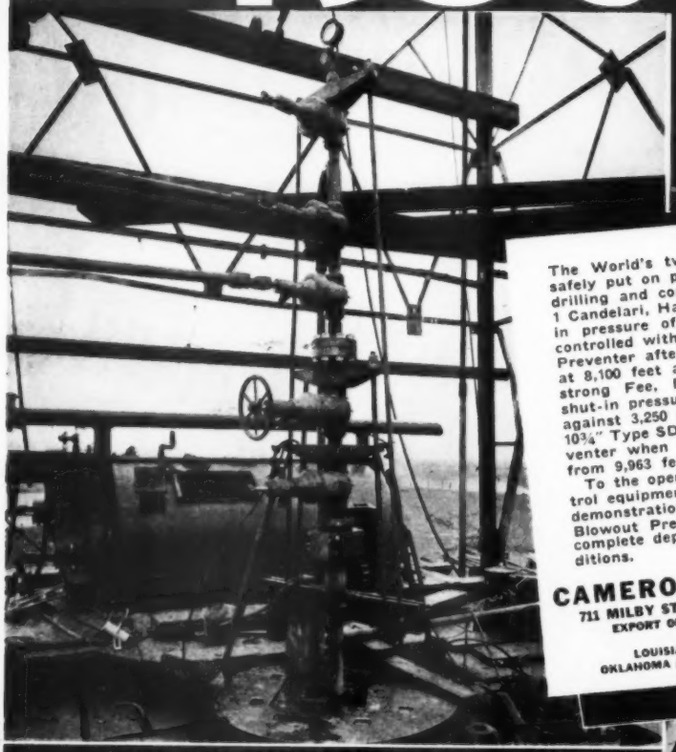

The World's two highest pressure wells were safely put on production in 1936 with Cameron drilling and completion control equipment. No. 1 Candelari, Harris County, Texas, with a shut-in pressure of 5,100 pounds, was successfully controlled with a Cameron Type 7-MH Blowout Preventer after losing drilling fluid in a cavity at 8,100 feet and blowing-in wild. No. 1 Armstrong Fee, Brazoria County, Texas, with a shut-in pressure of 3,600 pounds, was closed-in against 3,250 pounds pressure with a Cameron 10¾" Type SDA Pressure Operated Blowout Preventer when it started unloading drilling fluid from 9,963 feet.

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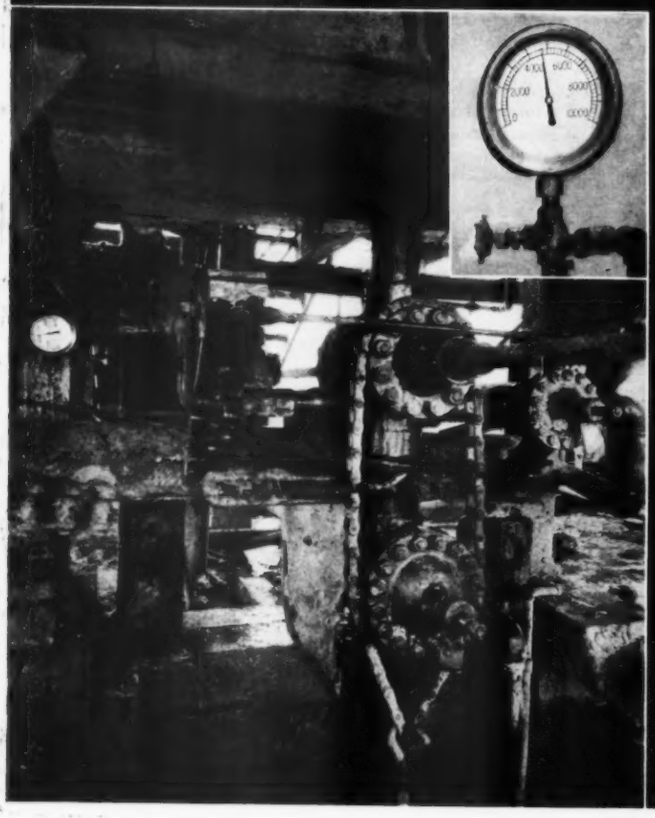
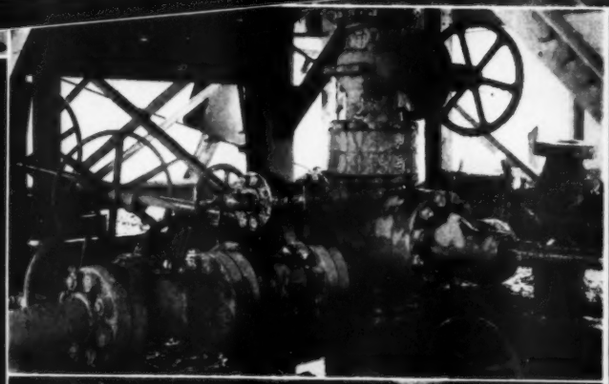
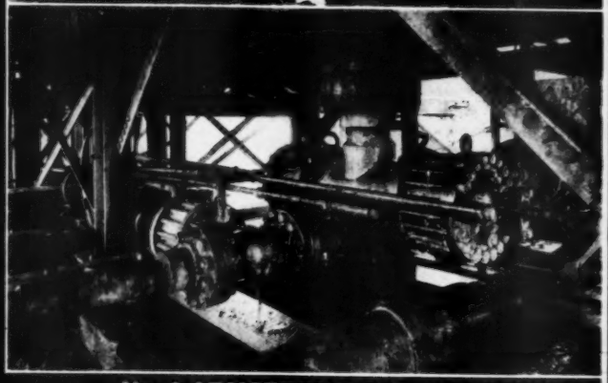
No. 1 CANDELARI, 5100 POUNDS

(Above) Flow control fittings made up on 3" drill pipe suspended on slips in the rotary.

(Below) Cameron Type 7-MH (6,000 pounds test) Manually Operated Blowout Preventer, with rams closed around 3" drill pipe and holding 4,700 pounds pressure, as shown by unretouched picture of pressure gauge to the left. (Inset, upper right hand corner) Enlargement of gauge on casing connections.







No. 1 ARMSTRONG FEE, 3600 POUNDS

(Bottom) Cameron Pressure Operated Drilling Control Hook-up used on No. 1 Armstrong Fee, consisting of Type SDA Blowout Preventer, Type DV Master Gate Valve and Type DV Flowline Valve, all 3,000 pounds test. This hook-up successfully sealed and held 3,250 pounds pressure.

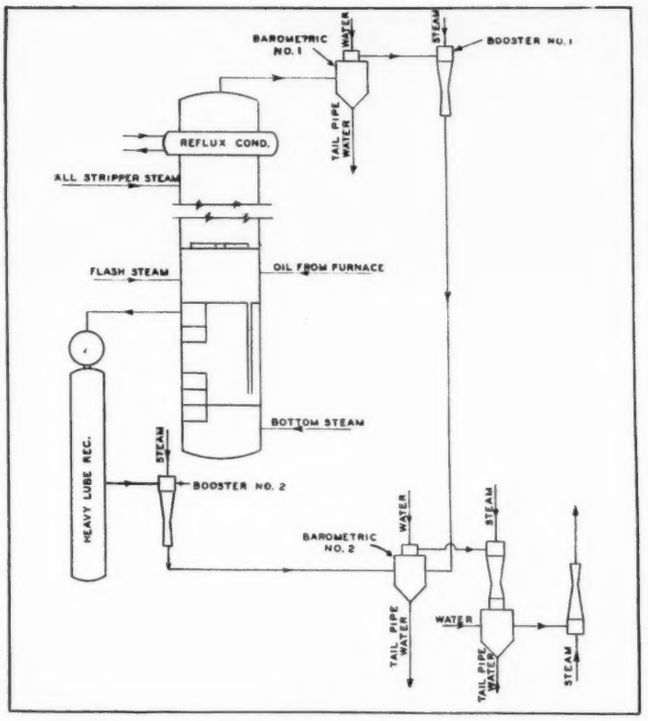
(Center) Hook-up used in drilling-in and completing No. 1 Armstrong Fee, consisting of 2-7" Master Gate Valves with 1-7" Type RH Cameron Manually Operated Preventer between, all 6,000 pounds test.

(Top) No. 1 Armstrong Fee after completion, showing flow connections flanged to drilling-in hook-up shown in center picture. Flow pressure of this well varies between 3,400 pounds and 3,500 pounds.

into the top of the vacuum column, the vapor passing upward through it. A pan below the reflux condenser collects the condensed oil and it flows to a receiver. Reflux oil is pumped from the receiver to the plate below the condenser and balance of the oil is pumped away as the overhead product.

VACUUM COLUMN

The vacuum column is divided into two sections so that a differential vacuum may be obtained. The residuum after flashing descends into a deep sealed reservoir near the bottom of the column and overflows several stripping trays descending into the bottom of the column. The pressure in the bottom stripping section of the column is maintained at 10 to 15 mm. Hg. abs. and that in the flash section at 30-35 mm. Hg. abs. This decreased pressure assures complete stripping of the asphalt bottoms. The stripped vapors pass upward through three bubble plates and into an accumulator. The three fractionating bubble plates may be refluxed from the accumulator by gravity to assure that no asphalt carries over. The stripped oil may be removed as a separate product or pumped back to about the middle of the column for additional fractionation and blending.



Flow diagram of vacuum unit

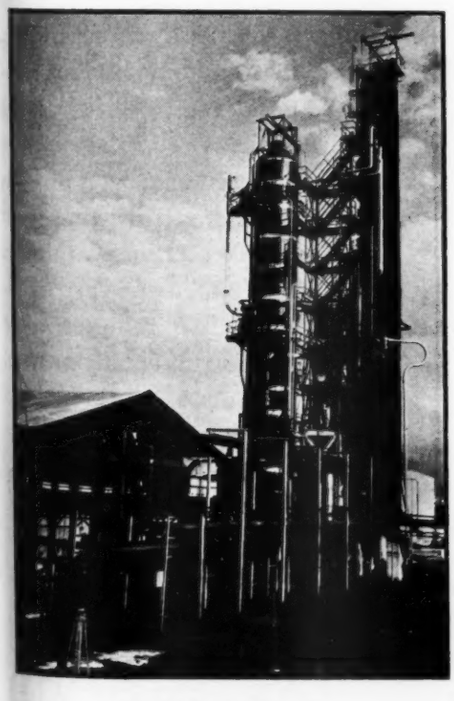
The vapors from the flash section are fractionated in the main or upper section of the column into three fractions consisting of the overhead and two side cuts. The bottom side cut is heavy lube stock, and the upper side cut, light lube stock and the overhead gas oil.

The vacuum column produces five fractions: Gas oil, light lube, heavy lube No. 1 and heavy lube No. 2, and asphalt or flux bottoms.

VACUUM EQUIPMENT

The vacuum equipment consists of a barometric condenser followed by a booster jet for the overhead vapor. The booster discharges into an intermediate barometric condenser which also receives the discharge from the booster jet which evacuates the bottom section of the column. An ejector pulls on the No. 2 condenser and discharges into an intercondenser. A final ejector pulls on the intercondenser and discharges through an exhaust head to the atmosphere.

Both asphaltic and paraffinous crude has been processed with equal satisfaction and lubricating oils of desired specification can be produced from either. The specifications of the vacuum unit residuum naturally depends on the character of the crude charged. The unit was designed to process 3,600 bbls. of crude per day but the average charge is 5,000 bbls. per day.



Completed two-stage unit

RUMANIAN CRUDE ANALYSIS

By GUSTAV EGLOFF
Universal Oil Products Co.

There are five crude-producing fields in Rumania: Prahova, Dambovitza, Buzau, Bacau and Neamtz. The first two are major producing fields in the country, since they contain the Gura Ocnitzei and the Moreni fields. There were 61,371,000 bbls. of crude oil produced in Rumania during 1935 with output slightly greater in 1936. There are 30 refineries in Rumania having a total daily capacity of 239,500 bbls., and a cracking capacity of 35,850 bbls. The Gura Ocnitzei and Moreni crudes have A.P.I. gravities of 37.2 and 36, respectively. Gura Ocnitzei produces 29.5 per cent of 392° F. endpoint gasoline, and the Moreni crude yields 28 per cent gasoline of the same endpoint. The sulfur content is 0.16 per cent and 0.14 per cent for the Gura Ocnitzei and Moreni crudes. The crude oil analyses are shown in the following tables:

PROPERTIES OF RUMANIAN CRUDE OILS

Field:	Moreni	Gura Ocnitzei
Gravity, deg. A.P.I.	36.0	37.2
Sulfur, per cent	0.14	0.16

100 cc. Engler Distillation

	Deg. F.	
Initial boiling point	158	172
Distilled over, per cent:		
5	216	226
10	262	255
20	334	326
30	405	395
40	493	482
50	566	558
60	645	631
70	707	672
80	726	730
90	725	...
Per cent distilled over	98.5	99.0
Coke by weight, per cent	1.3	1.2
At 302° F.	15.5	17.0
At 392° F.	28.0	29.5
At 482° F.	38.5	40.0
At 572° F.	50.5	52.0

GASOLINE FROM GURA OCNITZEI CRUDE OILS
(Engler Distillation)

Character of crude oil from which gasoline was obtained—	Sp. gr.	Per cent volume 100° C.	Per cent volume 150° C.	End-point ° C.
Paraffin-free	0.7215	58	96	160
	0.728–0.730	50	95	171
	0.745	31	86	193
Paraffin-containing	0.725	54	94	167
	0.728–0.730	49	95	172
	0.745	25	86	195

HYDROCARBON COMPOSITION OF THE GASOLINE FROM GURA OCNITZEI CRUDE OILS

Character of crude oil from which gasoline was obtained—	Sp. gr.	(Wt. per cent) Aromatic	(Wt. per cent) Naphthenic	Hydrocarbons paraffinic
Paraffin-free	0.7294	10.5	40.2	49.3
	0.7454	13.3	33.1	53.6
Paraffin-containing	0.7290	8.4	39.7	51.9
	0.7449	11.6	31.3	57.1

KEROSENE AND GAS OIL FROM GURA OCNITZEI CRUDE OILS
(Engler Distillation)

	Kerosene Sp. gr.	Kerosene 280° C.	Gas oil Sp. gr.	Gas oil 350° C.
Paraffin-free	0.816	94% vol.	0.862	92% vol.
Paraffin-containing	0.811	89% vol.	0.845	89% vol.

HYDROCARBON CONTENT OF GASOLINE FROM MORENI CRUDE OILS

Character of crude oil from which gasoline was obtained—	Sp. gr.	(Wt. per cent) Aromatic	(Wt. per cent) Naphthenic	Hydrocarbons paraffinic
Paraffin-free	0.723	11.6	45.6	42.8
	0.729	12.0	44.9	43.1
	0.745	14.3	40.2	45.5
Paraffin-containing	0.720	15.2	32.1	52.7
	0.728	16.7	30.6	52.7
	0.744	19.2	28.3	52.5

KEROSENE AND GAS OIL FROM MORENI CRUDE OILS
(Engler Distillation)

Character of crude oil—	Kerosene Sp. gr.	Kerosene 10% vol.	Kerosene 50% vol.	Kerosene 90% vol.
Paraffin-free	0.818	160° C.	187° C.	255° C.
Paraffin-containing	0.810	180° C.	220° C.	278° C.
	Gas oil			
Paraffin-free	0.869	215° C.	256° C.	310° C.
Paraffin-containing	0.848	280° C.	308° C.	363° C.

ANALYSIS OF STRAIGHT-RUN GASOLINE

Field:	Moreni			Gura Ocnitzei		
Endpoint of gasoline, deg. F.	302	392	476	302	392	476
Gravity, deg. A.P.I.	62.1	55.6	52.1	61.1	55.9	52.2
Color	30	30	....	30	30	....
Doctor test	Neg.	Neg.	....	Neg.	Neg.	....
Gum, mg./ 100 cc. (C.D.)	1	13	....	2	5	....
Sulfur, per cent	.02	.03	....	.02	.03	....
Octane No., R.M.	64	52	....	67	54	....

100 CC. A.S.T.M. DISTILLATION

Initial boiling point, deg. F.	113	130	173	113	128	162
Per cent distilled over:						
5	154	174	202	154	168	196
10	166	194	218	168	190	214
20	184	218	240	185	214	239
50	215	270	299	216	257	300
90	262	344	419	259	330	424
Endpoint, deg. F.	302	394	476	302	379	476
Per cent distilled over	98.0	98.0	98.0	98.0	98.0	98.0
Bottoms	0.5	1.0	1.0	1.0	1.0	1.0
Loss	1.5	1.0	1.0	1.0	1.0	1.0

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Records in *single readings,* accurately and automatically by photography, both the amount and the direction of inclination. Uses floating compass not subject to breakage; is self-checking and reliable. Used in *open holes only.* Lowered on a sand or bailing line at a speed ranging from 400 to 800 feet per minute. Records on paper discs are available within five minutes after removing instrument from hole. (U. S. Patents 1,812,994; 2,027,642 and others pending).

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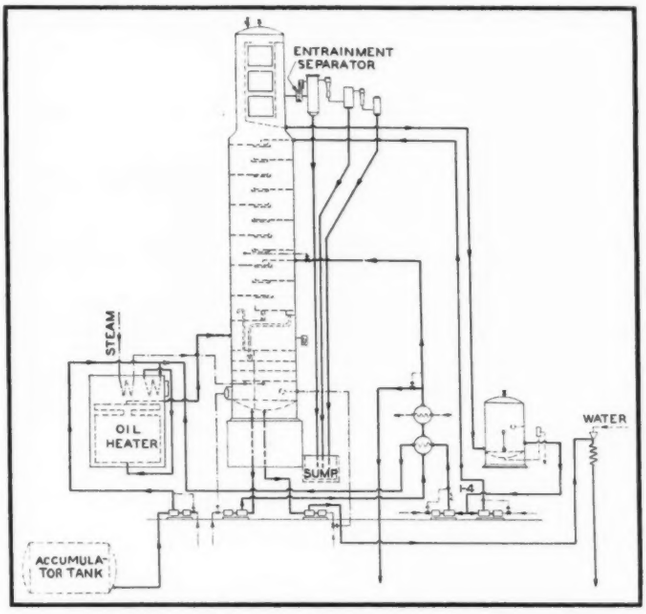
Solvent Refining Unit Added to Hanover, Germany, Refinery

The Elwerath refinery at Hanover, Germany, of the Gewerkschaft Deutsche Erdoel, has been expanded over the past year to provide for the manufacture of a complete line of lubricating oils from German crudes. This has been accomplished by the installation of a Coubrough vacuum distillation unit, a furfural solvent refining plant, clay contacting filter equipment and a benzol acetone dewaxing unit.

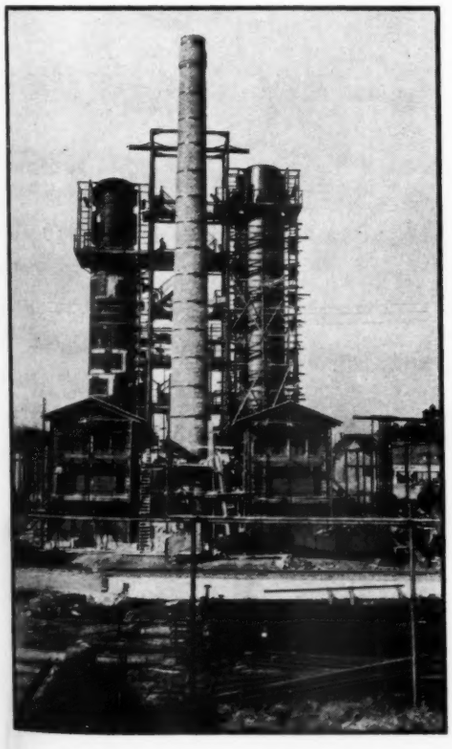
The topped crude is delivered from the present topping facilities to the Coubrough vacuum distillation unit. The topped crude has a gravity of 20.3 and represents by volume about 70 per cent of the local Nienhagen crude processed through the topping plant. The new equipment includes two heaters each served by an efficient tower. The topped crude is pumped through heat exchangers to the heater and is flashed into the first vacuum tower. The overhead from this unit is removed as a gas oil stream while taken from the side of this tower 200 neutral, extra heavy machine oil and light spindle oil are withdrawn. The bottoms are pumped through the second heater after blending carrier distillate to the second heater and flashed into the Coubrough vacuum tower. In this tower the carrier is removed overhead and the cylinder stock is taken off as a side stream, while a 10 penetration asphalt is removed from the bottom.

The raw lubricating oil stocks obtained from these two distillation units are next processed in the furfural extraction plant. This unit has been designed to solvent refine spindle oil, 200 neutral, extra heavy machine oil and cylinder stock. This stock is pumped to the lower section of the raschig ring packed extractor tower, while furfural is delivered to the top of this tower. A counter-current treat results with raffinate removed from the top of the tower and the extract from the bottom. A recovery unit which is part of this plant removes the furfural from the raffinate and extract layers by distillation and stripping. The different stocks are processed through this furfural plant and delivered into intermediate storage tankage, which serve as feed to the clay contacting plant. In this unit each of the furfural refined lubricating oil stocks are in turn mixed with clay circulated through a heater and the clay removed from the lubricating oil by the use of Sweetland filters with a final clearing up through a blotter press.

The furfural refined clay-contacted lubricating oil stocks are then processed in turn through the benzol acetone dewaxing plant. This plant is equipped with four continuous drum type revolving filters for removing the wax from the pressed oil after the lubricating oil and solvent have been chilled to the filtering temperature. The recovery unit for this plant removes the solvent from the slack wax and pressed oil by means of distillation and stripping. The various refined stocks are now sent to the blending, barrelling and shipping plant from which the finished lubricating oils are supplied to the trade. The units briefly described here were designed and erected by The Lummus Company.



Simplified flow chart of Coubrough vacuum distillation unit in the Elwerath refinery, Hanover, Germany



Dual heaters on Coubrough vacuum unit

Seek Oil in Tunisia

Reports from Tunisia state drilling operations at Djebel Kebir, resumed a few months ago, have led to a violent eruption of mud and gas from 850 metres.

MOTOR FUEL PUMPS IN GERMANY

Dr. Walter Ade's "Tanking Station Problem in Germany" (published by Paul Evert Verlag, Hamburg 11) gives an account of the petrol pump service organization in Germany. The total of 55,000 pumps, in existence before the ordinance restricting the erection of new pumps came into force, has shown but little increase. There have been some fluctuations in the proportionate number of pumps owned by the companies. One important change is that the share of the Benzol-Verband rose to about 7,500 in 1935, as the result of the 5,000 taken over from the Derop company. The pumps mainly dispensing German products are these 7,500 of the Benzol-Verband, 3,300 of Deutsche Gasolin, 365 of Reichskraftspritgesellschaft, as well as the 650 "Nitag" pumps which have been taken over by Wintershall. The other 43,000 provide mainly imported motor fuel. The author arrives at the following numbers and percentages of pumps:

	Number	Percentage
D.A.P.G.	18,327	32.75
Rhenania-Ossag	16,363	29.3
Olex	6,098	10.9
Benzol-Verband	7,740	13.8
Gasolin	3,315	5.9
Oelhag	953	1.7
R.K.S.	365	0.65
Various	2,788	5.0
Total	55,949	100.0

Furfural towers on solvent refining unit

Oil Under Irrawaddy River Bed Problem of India and Burmah

Extension of the mainland into the Irrawaddy River and diversion of the stream to protect other lands from periodic submersion during the rainy season is probably India's and Burmah's most interesting operating problems. Narrowing of the river bed at the point where it divides the Singu and Lanywa oil fields to the bare requirements of navigation probably will continue so long as successive locations toward the center of the river prove productive.

When it is no longer possible or practical to extend the mainland on either side of the river, modern directional drilling methods probably will be employed to drain the structure below the Irrawaddy itself.

Burmah's and India's oil production, possibly exploited by natives in hand-dug wells as early as the thirteenth century, remains approximately constant at 11,000,000 bbls. annually. The production has been increasing gradually, but operating methods in those far-eastern countries discourage sharp fluctuations possible from younger fields which still retain a part of their virgin pressure.

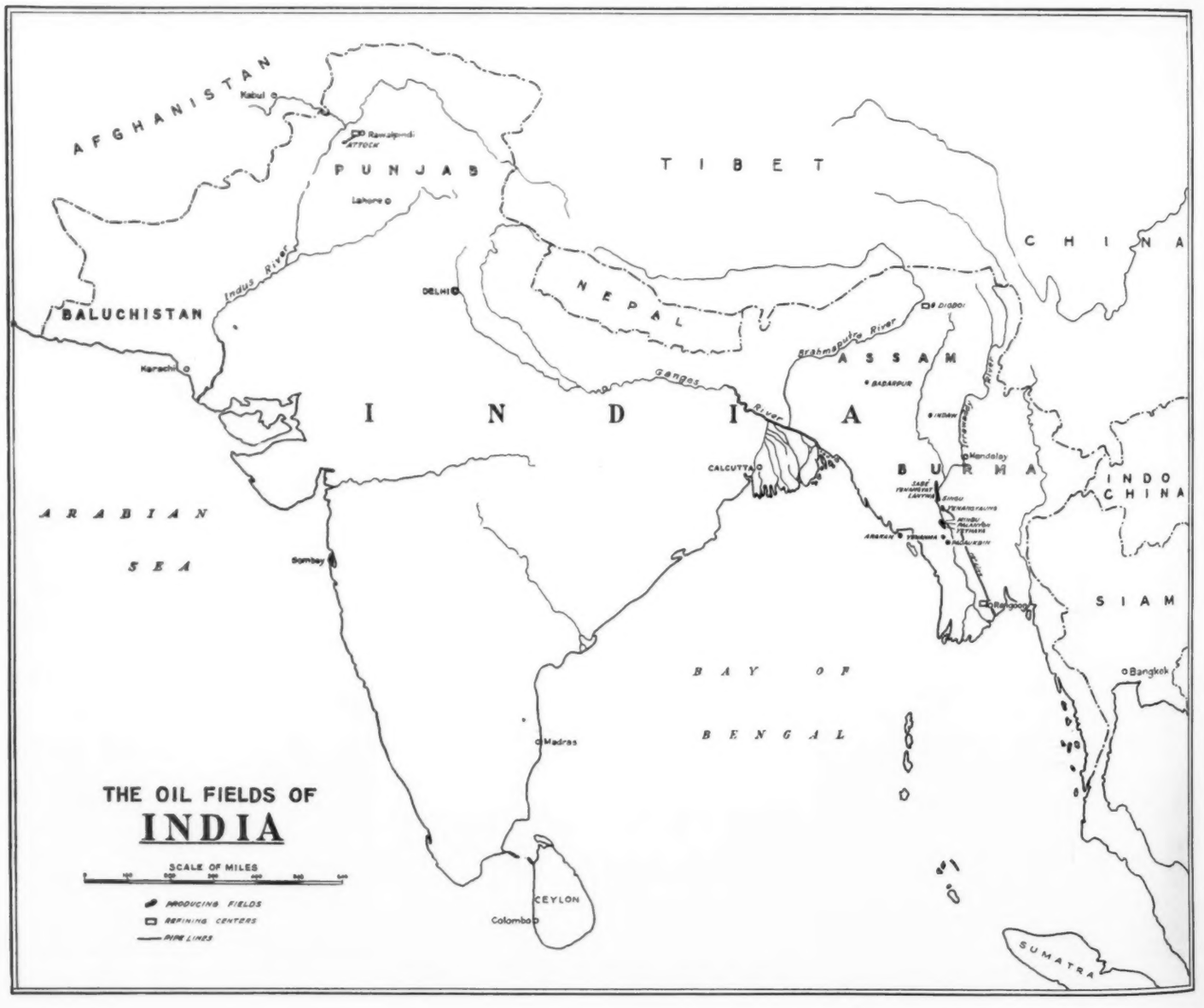
Available production data vary widely due, no doubt, to inclusion of natural gasoline and relatively light recovery from two or three of the lesser known smaller pools in one set of figures and their omission from another. Practically all the production of importance from Burmah is from the chain of narrow fields along the general course of the Irrawaddy River terminating at Rangoon.

The Burmah Oil Co., formed in 1886 by Finlay, Fleming & Co., drilled the first machine-bored oil wells in Burmah, British Burmah Oil Co., which later absorbed control of the Rangoon Oil Co., entered the exploitation field in 1906, followed in 1907 by the Indo-Burma Petroleum Co., organized by Jamal Brothers & Co., and Steel Brothers & Co.

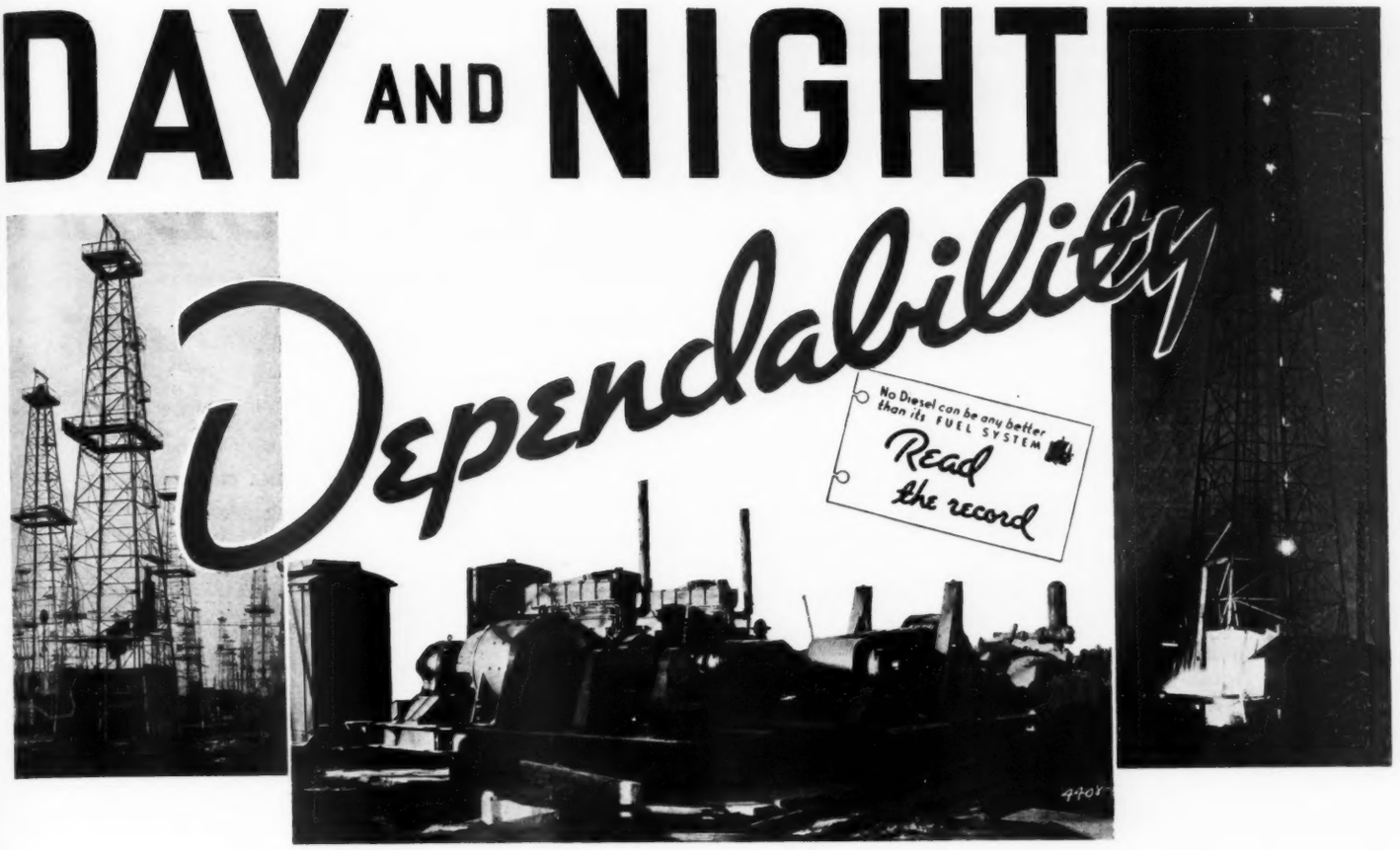
The Yenangyaung field, where some observers report evidence of native exploitation as early as the thirteenth century, remains the most productive in Burmah. Since 1926, when deeper production was found, operators in the Yenangyaung field have been engaged in drilling on the northern, eastern and southern flanks of the structure. Until a symmetrical condition of the elongated domal structure was proven by drilling on the eastern flank, production from Yenangyaung was confined to about 1,000 acres and to sands ranging from 1,800 to only 3,700 feet. Gradual spread of drilling to the east has more than doubled the productive extent, and sands as deep as 5,000 feet are now producing.

More detailed geological knowledge of the

(Continued on Page 114)



DAY AND NIGHT



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Properties of REPRESENTATIVE CRUDES

By GUSTAV EGLOFF
Universal Oil Products Co.

IRAN

The two producing fields in Iran, Masjiki-i-Sulaiman and Hoft Kel, yield crudes averaging 35 per cent of 400 endpoint gasoline with an octane number of 54. The oil has an A.P.I. gravity of about 38 containing 1.0 per cent of sulfur. There are two refineries in Iran, one of 3,000 bbls. and the other 165,000 bbls. crude capacity daily (1935) —the larger plant having a cracking capacity of 65,500 barrels. Analysis of the crude oil is as shown in the following table:

IRAN CRUDE OIL

	Entire crude	Light gasoline	Naphtha	Topped crude
Yields, vol. % of crude	100.0	16.4	18.7	62.3
Gravity, °A.P.I.	37.6	75.5	51.1	26.4
Specific gravity at 60° F.	0.8368	....	....	0.8961
Color, °Saybolt	.....	30+	30+	.....
Cu. dish gum, mg./100 cc.	.....	1	9	.....
Doctor test	.....	Pos.	Pos.	.....
Sulfur, per cent	1.02	0.03	0.14	1.46
Octane number	.....	67	38	.....
Flash, C.O.C., °F.	.....	....	....	220
Fire, C.O.C., °F.	.....	....	....	250
Flash, Pensky-Martens	.....	....	....	140
Vis. Furol @ 77° F., sec.	.....	....	....	20
B.S.&W., per cent	.....	....	....	0.2
Cold test, °F.	.....	....	....	45
Init. B.P., °F.	133	91	265	322

A.S.T.M. 100 cc. Distillation

Per cent over	°F.	°F.	°F.	°F.
5	148	108	280	460
10	215	120	283	493
20	283	133	289	544
30	355	143	296	582
50	521	163	308	688
70	687	183	325	750
90	753	211	353	(*)
Endpoint	(*)	249	406	(*)
Per cent over	97.0	98.0	99.0	96.0
Per cent bottoms	....	1.0	1.0	....
Per cent coke by weight	2.5	....	....	4.2
Per cent loss	....	1.0	0.0	....
Per cent over at 400° F.	35.5	....	....	2.0
Per cent over at 437° F.	40.0	....	....	3.5
Per cent over at 572° F.	56.0	....	....	27.5

*Superheated.

ANALYSES OF CRUDE OILS TO BE CONTINUED

This issue contains analyses of representative crude oils produced outside the United States. Data on additional crudes will be published in later issues.

BURMA

The crude oils from Burma are derived from seven producing areas: Yenangyaung, Singu, Yenangyat, Minbu, Indaw, Yenanma and Padaukbin. These crudes vary widely in their characteristics, and are largely paraffinic and naphthenic in properties. The crudes have an A.P.I. gravity of around 37 and a gasoline content from zero to 28 per cent. Burma is one of the oldest oil-producing countries in the world, there being 520 wells producing 400,000 bbls. in 1797. All of the oil wells were hand dug until 1889, and the question of refining and disposal of the amount of oil recovered at that time is not answered. The seven refineries in Burma treat 34,500 bbls. of crude daily, and the cracking capacity is 6,600 bbls. The analysis of the crude is shown in the following table:

BURMA CRUDE OILS

Crude Oil A.P.I. Gravity 36.4

	Per cent of crude
Gasoline, A.P.I. gravity 57.0	28.0
Kerosene, A.P.I. gravity 40.0	19.0
Heavy kerosene	32.0
Lubricating oil	3.5
Paraffin wax	8.0
Residue	8.0
Loss	1.5

Gasoline fraction:	Deg. F.
Initial boiling point	136
Per cent distilled over:	
25.5	212
67.0	257
94.0	302
Endpoint	322

	Panlanyon Sample 1	Panlanyon Sample 2 (normal)	Yethaya (normal)
Specific gravity	0.875	0.911	0.930
Water, per cent	.....	0.2	0.2
Distillate below 150° C., per cent	15½	3	nil
Distillate, 150° to 300° C., per cent	59	46	32
Intermediate and lubricating oils	20½	26	33
Petrolatum	nil	25	35

BAHREIN ISLANDS

The crude produced on the Bahrein Islands is a mixed base oil, the gravity ranging from 1,850 to 2,500 feet. The crude oil contains about 30 per cent of 400° F. endpoint gasoline of 42 octane rating. A refinery processing about 25,000 bbls. of crude a day is being built. The capacity for cracking topped crude is about 10,500 bbls. with a reforming unit of 6,000 bbls. being installed. The analysis of the crude is shown in the following table:

SUMATRA

Sumatra crude oils contain paraffins, naphthenes and aromatics.

The crude from the southern section contains up to 60 per cent gasoline and from 30 to 40 per cent kerosene. The Palembang oil has an A.P.I. gravity of 37.8 and contains about 26 per cent gasoline, the latter containing from 5.4 to 6.5 per cent of aromatics. This oil contains from 10 to 15 per cent wax. The three refineries in Sumatra have a capacity of 72,000 bbls. of crude per day and a cracking capacity of 18,000 bbls. daily. The

(Continued on Next Page)

BAHREIN ISLAND CRUDE OILS

Fractions removed—	None	242° F. gasoline	299° F. gasoline	350° F. gasoline	400° F. gasoline	240-360° F. naphtha	360-525° F. kerosene	Topped crude (after removal of 299° F. gasoline)	Topped crude (after removal of 350° F. gasoline)	Topped crude (after removal of 401° F. gasoline)	Topped crude (after removal of gasoline and kerosene)
Hempel Distillation											
Yields, volume per cent of crude	100.0	9.7	16.5	22.7	29.6	13.5	17.4	83.3	77.1	70.2	59.1
Properties of Fractions											
Gravity, °A.P.I.	31.9	81.7	74.5	68.0	62.7	58.4	44.5	25.7	24.1	22.0	18.9
Specific gravity at 60° F.	0.8660	0.6637	0.6869	0.7093	0.7286	0.7451	0.8040	0.9001	0.9094	0.9218	0.9408
Sulfur, per cent	2.0	0.015	0.02	0.02	0.03	0.03	.....	.....	.....	2.74	3.22
Octane number (C.F.R. Motor Method)	.....	64	55	48	42	36	.....	.....	.....	.....	.....
Flashpoint (Cleveland open cup), °F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Flashpoint (Pensky-Martens), °F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	230	275
Viscosity (Universal), sec. at 100° F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	226	568
Viscosity (Universal), sec. at 122° F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Viscosity (Furol), sec. at 77° F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Viscosity (Furol), sec. at 122° F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	19	335
B.s. and w., per cent	0.2	.....	.....	.....	.....	.....	.....	.....	.....	0.1	0.1
Cold test, °F.	Below 0	.....	.....	.....	.....	.....	.....	.....	.....	15	20
Engler Distillation (°F.)											
Initial B.P.	131	80	89	96	105	193	359	321	379	443	538
Per cent distilled over:											
5	204	92	114	126	137	224	374	360	419	482	566
10	252	102	126	142	158	233	382	388	440	508	591
20	338	116	145	169	191	245	392	456	502	558	633
30	429	128	162	192	220	255	401	534	572	611	660
50	618	151	192	232	271	275	421	658	676	682	689
70	712	178	220	267	313	296	446	691	706	705	712
90	747	214	257	308	362	329	486	730	735	.....	.....
Endpoint	748	242	299	350	401	361	525	730	735	735	735
Total per cent over	94.0	96.0	97.0	97.5	98.0	99.0	99.0	93.5	93.0	92.5	91.5
Per cent bottoms	.....	1.0	1.0	1.0	1.0	1.0	1.0	.....	.....	.....	.....
Per cent coke by weight	5.1	.....	.....	1.05	1.0	.....	.....	.....	.....	.....	.....
Per cent loss	.....	3.0	2.0	.....	.....	.....	.....	6.4	6.9	7.4	8.5
Per cent at 400° F.	27.5	.....	.....	.....	.....	.....	29.0	12.0	2.5	.....	.....
Per cent at 572° F.	45.5	.....	.....	.....	.....	.....	.....	35 5	30.0	23 0	6.0

MODERNIZE

Reduce Costs

GRANT tools are modern—and because they are modern—they do definitely lower your operating costs, through their efficient operation on the job for which they are built.

THE GRANT ROLLER CUTTER REAMER

Grant Roller Cutter Reamers are manufactured in single three point and (Fig. 6) double three point style. All reamers are equipped with specially designed roller bearings (Fig. 7)—the result of years of experience—contained within cutter and bearing directly upon cutter pin, thus minimizing friction, reducing cutter "sloppiness" due to thin wear, and insuring free rotation and full benefit of the chipping, shearing action of cutter teeth on formation.

Reamer body has been streamlined to provide the greatest possible clearance in hole for circulation passage, and directs circulation directly against teeth along the whole length of the cutter, insuring clean cutting teeth. Cutter teeth are deeply cut on a helix, are widely spaced, and are ringed with offsetting grooves.

Cutters are set in reamer body pockets on an angle with lower end leading as reamer is rotated downward, and are slightly tapered. These features serve two purposes in that cutter teeth attack and cut all projecting formation out to full hole gauge, rather than screwing down through formation upon bit, adding weight thereon and causing possible deflection of bit and finally of the hole.

Furthermore, cutters are set inwardly toward the center of reamer body, and the entire reaming action is progressive, with minimum weight requirements. Ample clearance through reamer body and around body make possible maximum pump pressures, while streamlining of both body and cutters permits of rapid rotation without holding bit back or failure to bring entire wall of hole to true full gauge by squeezing or screwing down through formation.

THE GRANT HYDROSTATIC PERFORATION CLEANER

Modern in both design and application, this tool (Fig. 4) is most effective in increasing production in wells where producing sands and pipe perforations have become clogged or choked as, in addition to its positive cleaning action, this tool removes from the hole the mud, sand, paraffin, asphalt, or other matter clogging production flow.

Through the use of opposing swab rubbers, any given section of screen, liner or perforated pipe may be concentrated upon. This double swab rubber assembly is slidable on the intake tube and is held in an upward position by friction against the casing or liner while running in the hole. When the Perforation Cleaner reaches desired location in hole, the tool is raised slightly until lower shoulder of the swab rubber assembly—which remains stationary in the liner due to friction of cups and weight of the fluid above them—depresses the tripping sleeve, frees the disc breaker, which, in turn, snaps against disc protecting loading chamber inlet and shatters it. A vacuum is created and a powerful suction set up, drawing into the loading chamber the debris choking perforations and an inrush of fluid from producing sands. Cleaner is then pulled, loading tube emptied and a new sealing disc placed in sliding holder, and tool is ready for re-run.

HYDRAULIC EXPANSION WALL SCRAPER

This tool (Fig. 3) has a truly remarkable capacity for blade expansion, ranging from 4" to 29", depending on size of body and gauge of the blades used. Blades are held in fully retracted position within body while being run into hole. Below casing shoe pump pressure is applied and rotation started, piston is forced downward, moving blades upward and outward.

This tool has proven advantageous in cleaning productive formations, by thoroughly removing encrusted rotary mud and other foreign matter from wall of the hole, or for providing enlarged reservoir for oil accumulation and exposing a greater area of oil sand.

In some formations it is effective in providing increased clearance for casing, often permitting use of larger pipe than otherwise would be possible, or to provide greater cementing area on clean formation.

ROLLER CUTTER HOLE ENLARGER

In hard formations this tool (Fig. 2) performs all of the operations of the Hydraulic Expansion Wall Scraper. The standard expansion capacity is from 3/4" to 1-1/4", measured from inside diameter of casing through which tool is to be run. Larger expansion can be provided when desired. Simple but positive expansion is assured in the use of this tool with a minimum number of working parts. Made in three blade type for soft formations.

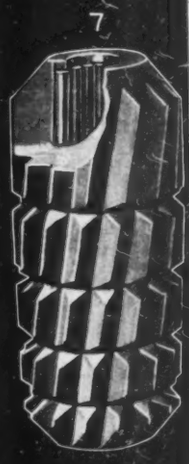
HYDROSTATIC BAILER

Operating on the same principle as the Hydrostatic Cleaner, this tool (Fig. 5) removes mud, sand, millings, small pieces of junk and other debris from the well. Run into the well on a wire line, bailer is sealed with disc which is broken by contacting bottom of hole with bailer bottom. A basket may be attached to lower end of bailer for fishing out larger pieces of junk.

GRANT-CHAMPION BALL BEARING, ALL STEEL ROTARY HOSE

Every joint ball bearing—fully enclosed—capable of full 360 degrees rotation and made of Nickeladium steel castings, and with joints of seamless steel tubing, this hose (Fig. 1) is flexible in all directions, has ample strength for usage with compounded pumps, or in case of suddenly encountered gas pressures. Supplied in all sizes and lengths to meet field requirements.

See the 1937 Composite Catalog for full and complete description of these and all other tools made by us, or write for your copy of our catalog.



GRANT OIL TOOL COMPANY
2042-44 East Vernon Avenue
LOS ANGELES, CALIFORNIA, U.S.A.

analysis of the crude is shown in the following table:

SUMATRA (PALEMBANG) CRUDE OILS

Gravity, °A.P.I.	37.8
Pourpoint, °F.	80
Viscosity (Saybolt) at 77° F.	184
Viscosity (Saybolt) at 100° F.	42
Viscosity (Saybolt) at 210° F.	31
Sulfur, per cent	0.12

Products by Distillation

Gasoline (25.9 per cent):	
Gravity, °A.P.I.	61.7
Octane No.	66.5
Initial	104
Maximum	323
Kerosene (25.3 per cent):	
Gravity, °A.P.I.	38.7
Flashpoint, °F.	146
Thermo viscosity	430
Initial	370
Maximum	529
Gas oil (3.3 per cent):	
Gravity, °A.P.I.	36.5
Flashpoint, °F.	280
Pourpoint, °F.	35
Viscosity at 100° F.	38
Paraffin distillate (27.6 per cent):	
Gravity, °A.P.I.	31.9
Flashpoint, °F.	360
Pourpoint, °F.	105
Viscosity at 130° F.	58
Viscosity at 210° F.	36
Initial	620
90 per cent	851
Bottoms (15.8 per cent):	
Gravity, °A.P.I.	15.5
Melting point, °F.	147

BORNEO

The crude oil from Borneo, Tarakan field, is a heavy oil with an A.P.I. gravity of about 18. It contains little gasoline, about 0.8 per cent of 428° F. endpoint. The sulfur content is 0.3 per cent and 0.6 per cent insoluble asphalt.

Tarakan crudes are used for gasoline, fuel oil, diesel oil, and lubricating oils. There is one refinery in Borneo having a daily capacity of 35,000 bbls. of crude and a cracking capacity of 7,400 bbls.

TYPICAL ANALYSIS OF TARAKAN OIL

Specific gravity at 59° F.	0.945 to 0.950
Vis. Engler at 122° F.	2
Vis. Redwood at 32° F.	120
Asphalt insoluble in alcohol ether, per cent	0.6
Coking value, per cent	4
Sulfur, per cent	0.3
Distilling up to 428 F.	0.8%, Sp. Gr. 0.852
Distilling 428-464° F.	3.1%, Sp. Gr. 0.870
Distilling 464-500° F.	6.6%, Sp. Gr. 0.886
Distilling 500-536° F.	9.4%, Sp. Gr. 0.900
Distilling 536-572° F.	10.1%, Sp. Gr. 0.914
Aromatic content in fractions to 536° C.	32%
Percentage of the kerosene fractions absorbable in 100% sulfuric acid	32

Analysis of Tarakan Crude Oil Used for Cracking

Baume gravity	18.2
Specific gravity	0.945
Fire, (Cleveland Open Cup)	245° F.
Flash (Cleveland Open Cup)	210° F.

Viscosity Saybolt Universal 100° F. 119 Sec.

Per cent distilled over:	Temp. °F.	Be. grav.
10	497	30.3
20	527	27.1
30	560	25.2
40	594	23.3
50	630	21.3
60	676	19.6
70	669	20.0
80	700	21.0
90	701	18.8
94.6	...	11.2

Water in the oil, per cent	0.25
Sulfur, per cent	0.268
Coke, per cent	5.07

SHULL PRODUCTS

Every Shull product, before placed on the market, undergoes rigid tests in the field to assure perfection in design. These products have been developed by practica rield engineers and have been adopted as the standard equipment by many companies.

BIRGE TYPE BAILER

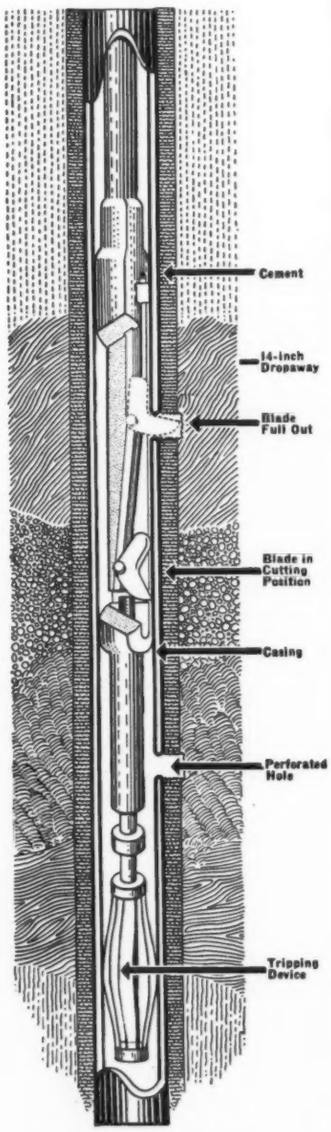
Bails - Washes - Cleans - Fishes

This is the new improved rigid valve, Type F, differential pressure bailer. It does the work of several tools — for cleaning wells, bailing, flushing perforations and fishing lost equipment. It is the highest speed bailer ever developed. It is automatic in action, simple in design, surest in operation. It cleans the bottom of the well by removing sand collections and heaving cuttings. It also cleans and opens the perforations. Pressure at the bottom of the well is used as a powerful hydraulic force to load the bailer at highest speed. Can also be used for spudding.

SHULL 1 & 2 STRINGER PERFORATOR

This heavy-duty perforator is equipped with sturdy cutting blades of sufficient length to penetrate all metal and cement, assuring a clean opening that reaches the formation without fear of collapsing casing. Smaller holes can be perforated than by any other method and a longer nrow is provided. Made for 1 and 2 strings. We also manufacture the Shull 3-row Perforator which cuts three rows of holes thru casing simultaneously.

Exterior View of Differential Pressure Bailer



View o Perforator in collapsed position, with dotted lines showing blade in cutting position.

OTHER SHULL PRODUCTS

Shull Swab — Shull Bridging Plug
Shull-Ace Tubing Slips and Split Spider
Shull Collar Locator — Flurry & Brandel Grab
Shull Perforation Cleaner
Shull-Ace Casing Cutter
Shull-Ace Line Spooler

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SHULL PERFORATING CO., Inc.
2750 Cherry Ave., Long Beach, California

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SAKHALIN ISLAND

The oil fields of Sakhalin Island are located along the northeastern coast. The quality of the crudes varies from 17° Be. to 40° Be., while the bulk of the production from deeper wells averages about 21° Be. The gasoline content ranges from no gasoline in the Chakrui crude to about 30 per cent gasoline in the oil from the deep wells at Nutovo field. The production for Sakhalin Island during 1935 was 2,920,000 bbls.

Refineries for the crude oil are located in Russia at Vladivostok and Khabaroosk, and for the Japanese crude production from the island, they are located on the western coast of Japan northwest of Tokyo.

The analyses of crude oils are shown in the following tables:

SAKHALIN ISLAND (OKHINSKEI) CRUDE OILS

Specific gravity	0.931
Viscosity	3.14
Freezing point, °F.	Below —4.0
Water, per cent	0.3

Distillation

Temperature, °F.—	Per cent	Sp. gr.
Below 392	3.03	0.804
392-428	3.26	0.832
428-464	4.38	0.894
464-500	4.60	0.865
500-518	2.78	0.871
518-536	2.88	0.877
536-572	6.45	0.885

Mazout

Specific gravity	0.964
Flashpoint (Pensky-Martens), °F.	300.2
Cold test, °F.	0.4
Viscosity at —58° F.	17.4

SAKHALIN ISLAND (NUTA FIELD) CRUDE OILS

Specific gravity	0.864-0.865
Pourpoint, °F.	+6
Viscosity at 68° F.	1.31-1.33
Flashpoint (Abel-Pensky), °F.	122-125.6
Asphaltenes, per cent	0.20-0.30
Acids, per cent	0.092
Sulfur, per cent	0.38-0.39
Carbon, per cent	0.44-0.53
Iodine number	8.85-8.89
Ash	0.01-0.008
Paraffin (Holde), per cent	1.71-1.79
Melting point, °F.	123.8-132.8

Distillation

	Temp. °F.	Per cent
Gasoline	302-320	2.4
Naphtha	302-392	20.2
Kerosene	392-518	29.6
Light gas oil	518-572	11.2
Heavy gas oil		12.4
Lubricating oil fractions		30.3
Bottoms		5.2

The naphtha fractions are high in aromatic compounds and low in naphthenes.

(Continued on Next Page)

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— Everything, engineered, tested, perfected, assembled, ready. To you that means service, production — profit. Every Ideco product is produced in our own factories under the supervision of those who engineered them. "There is no substitute for Oil Country Experience in Building Oil Country Equipment" — Ideco has years of Oil Country experience, engineering experience, as well as the plant capacity and distribution facilities to serve the Oil Industry everywhere.

DEEP WELL ROTARY DRILLING EQUIPMENT

CHAIN
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DRAWWORKS
DRILL COLLARS
FISH TAIL BITS
FLOAT SHOES AND COLLARS
GRIEF STEMS
ROTARIES
SUBSTRUCTURES - (STEEL)
SWIVELS
TRAVELING BLOCKS
WHIP STOCKS

OIL WELL PRODUCTION EQUIPMENT

BAILING REELS
CHAIN RIGS
CROWN BLOCKS
DERRICKS - PRODUCTION
ENGINE STUB SHAFTS
GAS ENGINES
GAS TRAP SUPPORTS
GEARED PUMPING UNITS
GEARED SPEED REDUCERS
JACK POSTS - (STEEL)
JACK SHAFTS
PITMANS - (STEEL)
PITMAN OSCILLATORS
POLISHED ROD GRIPS
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PRODUCTION BULL WHEELS
PUMPING JACKS
RIG IRONS
ROTARY COUNTERBALANCES
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SNATCH BLOCKS
STANDARD STEEL RIGS
TRACTOR PULL POSTS
TUBING BLOCKS
WALKING BEAMS

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BULL WHEELS - (STEEL)
CALF WHEELS - (STEEL)
CASING BLOCKS
CASING SHOES
CROWN BLOCKS
DERRICKS - CABLE TOOL
DRILLING MACHINES
DRILLING BITS
ELEVATORS
FISHING TOOLS
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JARS
PITMANS - (STEEL)
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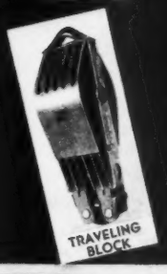
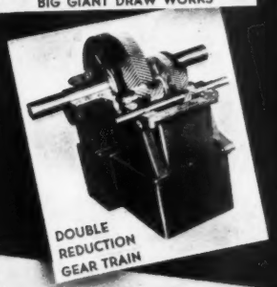

TRAVELING BLOCK

PLAIN ROTARY

WIRE LINE REEL

BIG GIANT DRAW WORKS


DOUBLE REDUCTION GEAR TRAIN

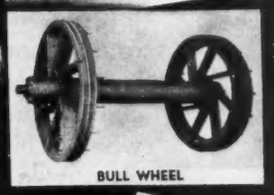
PUMPING MACHINE

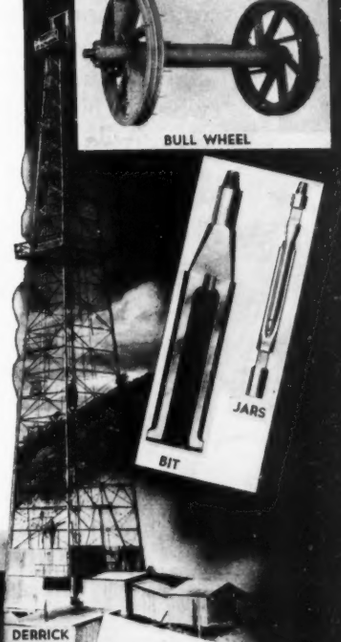
STANDARD RIG

SWIVEL

CHAIN DRIVEN SAND REEL

CROWN BLOCK


BULL WHEEL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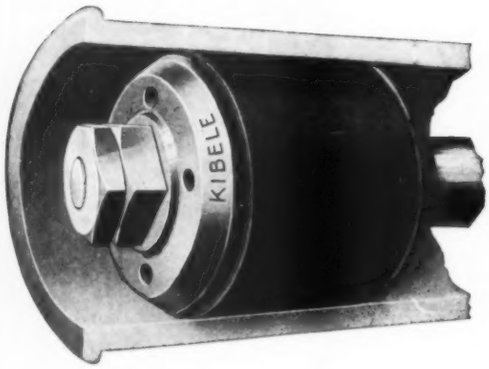
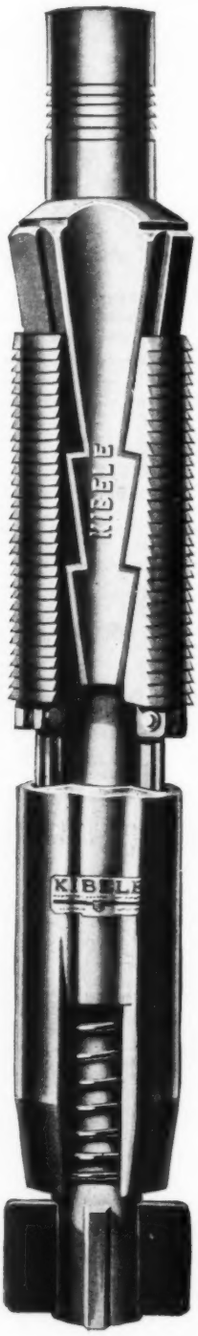


Kibele Boiler Feed Pump Piston (Patented)



Kibele Three-Step Tubing Catcher for wells more than 4,000 feet deep. (Patents Pending)

Kibele 7" Two-cup Casing Swab, Convertible from One-cup Type. (Patents Pending)

Kibele 2½" Tubing Swab.

Kibele Tubing Catchers provide sufficient slip area for any depth well without putting excessive back-pressure on sand and without obstructing free passage of gas or fluid while lowering catcher. The strain exerted by slips on casing wall when tubing falls is spread over sufficient area to eliminate distorted casing and wedged catchers.

A world favorite is the Kibele Boiler Feed Pump Piston. It is sturdy, compact and dependable. Equipped with replaceable high-grade rubber rings which resist wear, heat and boiler compound. Ideally fitted for core drilling work.

Three essentials determine the value of a swab: 1. LONG WEARING CUPS. 2. SWIFT PASSAGE. 3. RUGGED CONSTRUCTION. Kibele has all three. Made in one-cup and two-cup sizes. Used by operators all the way from California east to Burma.

For detailed information see Composite Catalog.

Export Representative: Continental-Emsco Co.
30 Rockefeller Plaza, New York, N. Y.

KIBELE
MANUFACTURING COMPANY

FLUID EXPANDING PUMP PISTONS — A KIBELE DOESN'T COST... IT EARNS — SWABS and TUBING CATCHERS

5101 MAPLE AVE. DALLAS, TEXAS

SAKHALIN ISLAND (KATANGLI) CRUDE OILS

Specific gravity	0.943
Viscosity at 122° F.	6.7
Flashpoint (Pensky-Martens), °F.	215.6-258.8
Cold test, °F.	Below —4
Sulfur (Eschka), per cent	0.42-0.44

Engler Distillation

	°F.
Initial B.P.	427
Per cent distilled over:	
3.0 to 4.5	Below 482
8.0 to 9.0	527
19.0 to 20.0	572

Vacuum Distillation of Bottoms

Per cent by weight	Specific gravity	Viscosity	°F.
17.52	0.8925	1.14	291.2-399.2
17.71	0.9168	1.70	399.2-482.0
24.26	0.9485	10.62	482.0-611.6

Crudes do not contain any gasoline and only the heavier kerosene fraction.

SAKHALIN ISLAND (CHAKRUI RIVER) CRUDE OILS*

Specific gravity	0.943
Viscosity at 122° F.	4.38
Flashpoint (Pensky-Martens), °F.	208.4
Cold test, °F.	—15

Engler Distillation

	°F.
Initial B.P.	
Per cent distilled over:	
4.0	482
13.5	482-527
29.0	527-572
Residue, per cent	68
Loss, per cent	3

Vacuum Distillation of Residue

20 per cent lubricating oil, cold test, °F.	23

SAKHALIN ISLAND (LYANGRI) CRUDE OILS

Specific gravity	0.951
Viscosity at 122° F.	3.6
Flashpoint (Pensky-Martens), °F.	219.2
Cold test, °F.	—2.2

Engler Distillation

	°F.
Initial B.P.	
Per cent distilled over:	
1.0	Below 482
12.5	482-527
27.5	527-572
Residue, per cent	70
Loss, per cent	2.5

Vacuum Distillation of Residue

18 per cent lubricating oil distillate, cold test, °F.	38.3

*Chakrui River crude has an asphaltic base, no gasoline fraction, and a very small kerosene content.

SAKHALIN ISLAND (EAST NUTOVO) CRUDE OILS

Specific gravity	0.902
Viscosity at 122° F.	1.93
Flashpoint (Pensky-Martens), °F.	98
Cold test, °F.	
Sulfur, per cent	0.38
Paraffin wax (Holde), per cent	

Distillation

Temperature, °F.	Per cent
Below 392	2.16
392-518	20.62
Above 698	77.1
Viscosity at 122° F.	3.12

Residue—Gas Oil (1:1)

Specific gravity	0.944
Viscosity at 122° F.	5.6
Pour test, °F.	Below —0.4
Flashpoint, °F.	300.2

Vacuum Distillation of Crude

	Per cent
Kerosene	30
Gas oil	20-25
Light lubricants	15-20
Heavy lubricants	20

SAKHALIN ISLAND (WEST NUTOVO) CRUDE OILS

Specific gravity	0.830
Viscosity at 122° F.	1.1
Flashpoint (Pensky-Martens), °F.	56.3
Cold test, °F.	Below —4
Sulfur, per cent	0.13
Paraffin wax (Holde), per cent	3.6

Distillation

Temperature, °F.	Per cent
Below 302	26.3
302-392	20.5
392-572	30.5
Above 572	22.1

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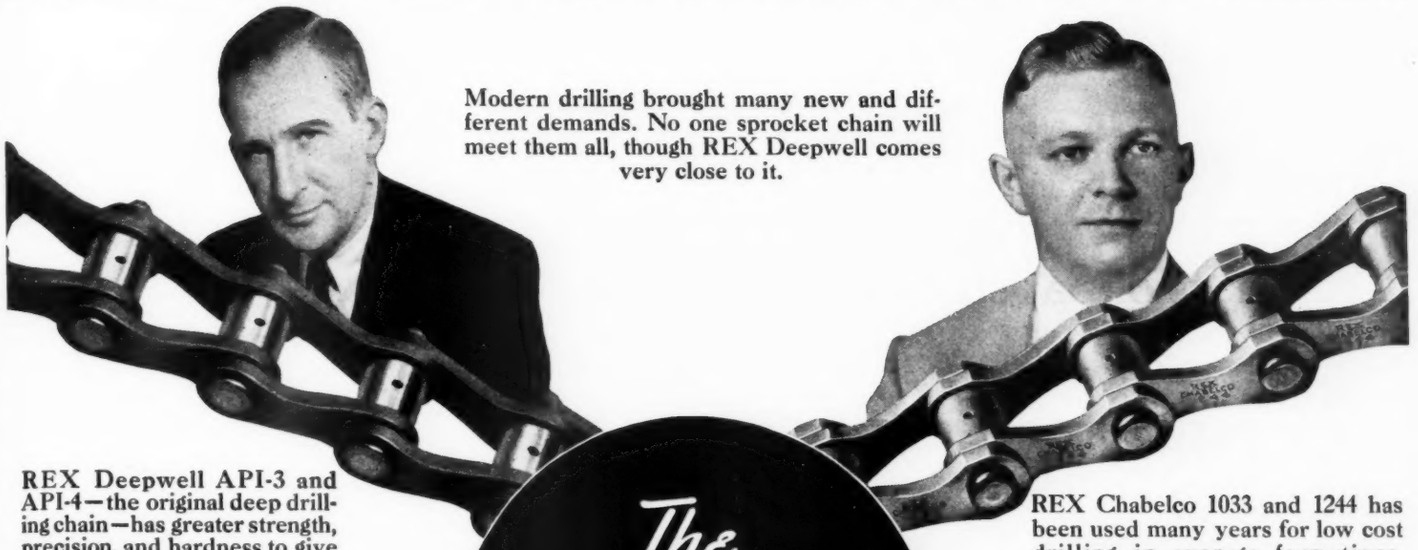
HOW TO HANDLE IT IF *IT* IS ROTARY DRILLING



Modern drilling brought many new and different demands. No one sprocket chain will meet them all, though REX Deepwell comes very close to it.

REX Deepwell API-3 and API-4—the original deep drilling chain—has greater strength, precision, and hardness to give low cost per foot of hole in hard drilling, and greatly reduced cost in average drilling.

REX Chabelco 1033 and 1244 has been used many years for low cost drilling in average formations. Chabelco is the original steel oil well chain.

The Greatest Chains That Ever Hit The Oil Fields

REX Universal 3125 and D-3125—single or double strands—has Deepwell's strength and precision with shorter pitch for smooth operation over cut-tooth sprockets at greatly increased drilling speeds.

REX Champion API-3 and API-4—has the same precision and fine finish of Deepwell, plus the added weight and strength required for the hardest, deepest drilling—with maximum loads.

One of these four chains will give you what you need—for any rig—for any type of drilling.

CHAIN BELT COMPANY, 1619 West Bruce Street, Milwaukee, Wisconsin

CHAIN BELT COMPANY OF MILWAUKEE

REX

Oil Well Chains

DEEPWELL API-3—API-4 • CHABELCO 1033—1244 • CHAMPION API-3—API-4 • UNIVERSAL 3125—D-3125

Gasoline Fraction

Specific gravity	0.766
Color	0
Doctor test	Neg.
Iodine number	0.82
Aromatic hydrocarbons, per cent	13.8

Fuel Oil

Pour test (Holde), °F.	82.4
Flashpoint (Brenken), °F.	329
Fire test, °F.	379.4
Viscosity at 122° F.	2.2
Paraffin wax, per cent	16.3

TRINIDAD

The asphalt deposits in Trinidad have been well known. The oil fields which are grouped around Pitch Lake are 15 in number and in 1935 produced 11,671,000 bbls. of crude oil. Three typical Trinidad crudes have paraffin, mixed, and napthenе bases varying in A.P.I. gravity from 24.3 to 46 with gasoline contents from 12 to 41 per cent. There are five refineries in Trinidad having a daily crude oil capacity of 39,500 bbls. and a cracking capacity of 10,000 bbls. The analysis of the crudes is shown in following table.

TRINIDAD CRUDE OILS

Base of crude:	Paraffin (Tabuguite)	Mixed	Naphthene
Gravity, deg. A.P.I.	46	41.7	24.3
Wax, per cent	2.5	1.5	....
Sulphur, per cent	0.29	0.7	....
Gasoline, per cent of crude	32.6	41	12
Kerosene, per cent of crude	28.4	15	14
Gas oil, per cent of crude	16.0	....	37
Lubricating oil distillate, per cent of crude	21.8	....	....
Endpoint gasoline, deg. F.	300	350	400
Gasoline per cent	7.6	16.5	22.0
Topped crude, per cent	91.7	82.8	77.3
Distillation loss, per cent	0.7	0.7	0.7

Analysis of Straight Run Gasolines

Endpoint gasoline, deg. F.	300	350	400
Gravity, deg. A.P.I.	62.7	56.0	50.1
Octane number	70	69	68
Gum, mg./100 cc. (copper dish)	0	1	3
Sulfur, per cent	0.03	0.04	0.06

100 cc. A.S.T.M. Distillation

	Deg. F.		
Initial boiling point	120	140	142
Per cent distilled over:			
5	146	170	180
10	150	186	206
20	172	206	232
30	182	222	250
40	192	233	266
50	204	246	281
60	214	256	295
70	224	268	310
80	236	280	326
90	254	296	348
95	270	310	366
Endpoint	298	348	401
Total per cent over	98.0	98.0	98.9
Per cent bottoms	0.5	1.0	1.0
Per cent loss	1.5	1.0	1.0

Yields of Trinidad Cracked Products

Charge:	Crude oil	Topped crude	Gas oil
Gasoline, per cent of charge	55.1	45.6	58.9
Octane number	85	87	91
Residuum, per cent of charge	33.6	48.9	25.4
Coke, gas and loss, per cent of charge	11.0	5.5	15.7
Gas, cu. ft./bbl. of charge	412	336	529

16 Years of Satisfactory Performance

—that's the record behind the

NECO PUMP

This working-barrel pump has been in use in the various oil fields of the world and repeat orders come from every field.

It gives better service!

No tubing pulling—less rod pulling—will not sand up—gas will not work on valves.

The Pump you will eventually use!

Neco Oversize Pumps use Standard A.P.I. Balls and Seats in both valves. Will handle a larger volume of fluid than is possible by any other inserted or liner pump.

NECO SWIVEL ROPE SOCKET

This is the standard swabbing Rope Socket of the world. The swivel body and nut are made from tool steel, heat-treated and hardened.

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COLOMBIA

The Infantas oil field in Colombia has been producing oil for 14 years, the La Cira for six years, and in 1933 the first crude oil in the Petrolia area was reached at a depth of 490 feet. The average depth of the Infantas and La Cira fields is 1,512 feet.

Tests of the crude samples from these fields show about 27° A.P.I. gravity for Infantas, 25° A.P.I. for La Cira, and 42° A.P.I. for the Petrolia crudes. The first commercial well in the Petrolia area produced at a depth of 668 to 708 feet with a daily production of 2,500 bbls.

The total Colombian production during 1935 was 17,595,000 bbls., one refinery in Colombia treats 6,000 bbls of crude daily with no cracking installations.

Crude oil analyses are shown in following tables:

COLOMBIA CRUDE ANALYSES

Gravity, °A.P.I.	42
Viscosity at 100° F.	32
Fourpoint, °F.	Below 50
Color	Light green
Color (N.P.A.)	6.5
Sulfur, per cent	0.16

Distillation

Gasoline, per cent	52
Distillate and gas oil, per cent	22
Fuel oil residuum, per cent	5

Pale and red neutrals are obtained from the heavier fractions.

COLOMBIAN CRUDE OIL[1]

Properties of Crude

Gravity, °A.P.I.	25.2
Viscosity (Furol), sec. at 32° F.	118
Pourpoint, °F.	—50
Asphalt, per cent	24.40
Bomb S.D., per cent	0.89

Saybolt Distillation

	°F.
Initial B.P.	136
Per cent distilled over:	
10	351
20	473
30	567
40	608
50	661
60	687
Per cent at 392° F.	13.0
Per cent at 550° F.	27.75
Gas (4.16 cu. ft./42 gal. bbl), per cent	0.26
Water, per cent	0.13

Naphtha—	Into 300° F. vapor temperature	Into 400° F. vapor temperature
Yield, per cent	9.6	16.0
Cut range, per cent	(0.4–10)	(0.4–16.4)
Gravity, °A.P.I.	61.3	54.1
Bomb S.D., per cent	.018	.023
Copper No.	1	1
Octane No. (C.F.R. Motor Method)	0	61.0
Reid Vapor pressure, lbs./sq. in.	4.4	2.9
Per cent at 140° F.	1.0	0.5
Per cent at 158° F.	5.5	2.0
Per cent at 212° F.	41.5	17.5
Per cent at 257° F.	82.0	39.5
Per cent at 284° F.	97.0	55.5
Per cent at 356° F.		91.5
Per cent at 374° F.		97.0
F.B.P., °F.	302	385

[1]Courtesy of Standard Oil Co. New Jersey.

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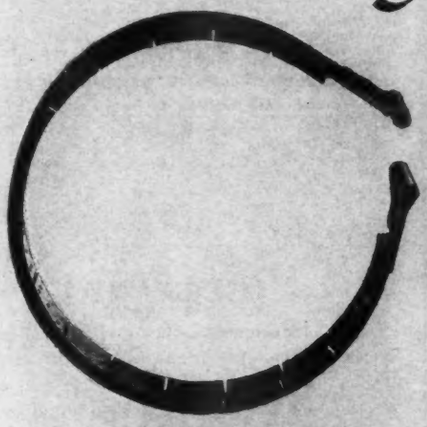
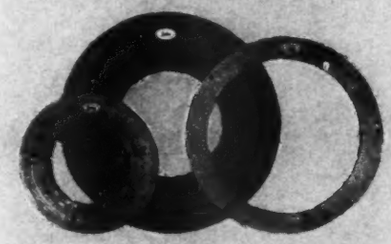
There is no substitute for Gatke Quality



Eight-foot brake band lined with GATKE Moulded Brake Blocks.



GATKE Moulded Clutch Facings are manufactured for every size and type of equipment. Each is precisely accurate in dimensions and detail.

ASBESTOS BRAKE AND FRICTION BLOCKS

Gatke

WOVEN BRAKE LINING

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HYDRAULIC COMPRESSED BRAKE LINING

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MOULDED NON-METALLIC GEARS AND BEARINGS

Gatke

ASBESTOS PACKINGS

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Also—send details regarding any particular problem you have pertaining to brakes, clutches, frictions, gears or bearings. Our Engineers will gladly assist you — without any obligation.

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GATKE HEAVY DUTY WOVEN

Developed especially for safe and easy handling of great over-loads under difficult conditions.

1—The purest and best grade of asbestos spinning fibre.

2—As further protection against scoring, soft zinc wire is twisted with the yarn.

3—Interwoven into a unified mass — no layers to strip.

4—Saturated with high heat resisting frictional compound.

5—Baked, calendered and compressed into a uniform mass that is impervious to oil, grease, or moisture.

6—Surface ground (one side) for easy application.

Woven or Moulded Cone Facings built to fit the job. Replace roll lining giving better performance and many times longer life.

Distillation

	°F.	°F.
Initial B.P.	348	405
Per cent distilled over:		
10	382	420
20	398	423
30	421	425
40	439	427
50	456	429
60	474	431
70	492	433
80	512	438
90	535	446
Endpoint	562	471

Other products—	*Gas oil	Lube oil	Bottoms	Narrow lube cut
Yield, per cent	26.6	15.0	42.0	2.6
Cut range, per cent	(16.4-43.0)	(43.0-58.0)	(58.0-100.0)	(55.4-58.0)
Gravity, °A.P.I.	31.8	23.2	13.0	21.1
Flash point, °F.	....	390	540	390
V/100	40.7	412	....	835
V/210	....	46.1	1668	64.4
Cloud, °F.	Below —60	....	....	....
Pourpoint, °F.	Below —60	—35	75	—15
An. pt., °F.	149	171	....	183
Bomb sulfur, per cent	0.40	....	....	....
V. I.	....	....	....	26
Diesel index	47.4	....	....	....
Neut. No.	2.90	....	....	1.50

*Light gas oil to 700° F. vapor temperature.

COLOMBIAN CRUDE OILS

Refined oil—	Maximum refined	Minimum refined
Yield, per cent	21.5	5.6
Cut range, per cent	(10.0-31.5)	(16.4-22.0)
Gravity, °A.P.I.	37.2	38.1
Viscosity (R.O.), °F.	475	450
Ring No.	7	11
Sulfur, per cent	.167	.088
Copper No.	1	1
Flashpoint (Abel), °F.	135	150+

MOROCCO (Spanish)

The Moroccan field is similar to the Rumanian field. The specific gravity at 15° C. is 0.859. The oil is green-brown in color. It yields 21 per cent gasoline and is produced at a depth of 427 feet. The one refinery in Spain has a daily capacity of 1,500 bbls. and no cracking installation. The analysis of the crude is shown in the following table:

SPANISH (MOROCCO) CRUDE OIL

Water, per cent	4.78
Specific gravity at 59° F.	0.859
Flashpoint (open flame), °F.	43.6
Cold point, °F.	158–159.8
Calorific value, cal. per gr. (19,282 B.t.u. per lb.)	10,712
Ash, per cent	0.0026
Viscosity (Engler°), (68 sec. Saybolt)	2.00

Acid content, calculated to oleic acid, 0.211 per cent

distillation.

	Per cent	Sp. gr.
154-302° F., gasoline	21.00	0.761
302-572° F., kerosene	47.60	0.860
Over 572° F., kerosene	27.30	0.871
Coke	2.30	
Gas and loss	1.80	

GERMANY

Two producing areas in Germany, one at Nienhagen and the other at Edessa, yield 10 per cent of 400° F. endpoint gasoline and 27 per cent of 410° F. endpoint gasoline. There are 30 refineries in Germany operating on crude oil; the combined daily capacity is 48,000 bbls., with three cracking a total of 6,000 bbls. per day. The analyses of the crudes are shown in the following table:

GERMAN CRUDE OIL ANALYSES

	Nienhagen	Edessa
A.P.I. gravity	26.6	34.5
Sulfur	0.5	0.3
Viscosity Furol at 77° F. (sec.)	....	12
Cold test, deg. F.	....	15
B.S.&W., per cent	1.2	0.4
Water, per cent	1.0	....
Coke, per cent by weight	4.6	3.0
Initial boiling point	230	140

A.S.T.M. 100 cc. Distillation

Per cent over:	—Deg. F.—	
5	300	190
10	384	248
20	497	346
30	588	440
40	640	528
50	662	607
60	674	672
70	680	698
80	688	712
90	698	724
95	718	728
Endpoint	718	740
Per cent over at 400° F.	10.0	....
Per cent over at 410° F.	11.0	27.0
Per cent over at 427° F.	13.0	29.5
Per cent over at 572° F.	27.0	45.0

EGYPT

A new Egyptian law has been prepared and is now awaiting action by the Minister of Finance clearing existing confusion on title to sub-soil and the position of claimants to certain areas for mining privileges. The law was drawn with a view to clearing obstacles to petroleum development in Egypt which has received increasing attention since Anglo-Egyptian Oilfields Ltd., an Egyptian subsidiary of the Royal Dutch-Shell group, filed claims with the Minister of Finance on various areas in the Western Desert and along the Red Sea coast.

The only production existing in Egypt at present is at Hurghada on the Red Sea and is operated by Anglo-Egyptian. The current production is aproximately 3,650 bbls. daily. The crude production is moved by small tankers to Suez where it is refined and sold chiefly in the Egyptian market.

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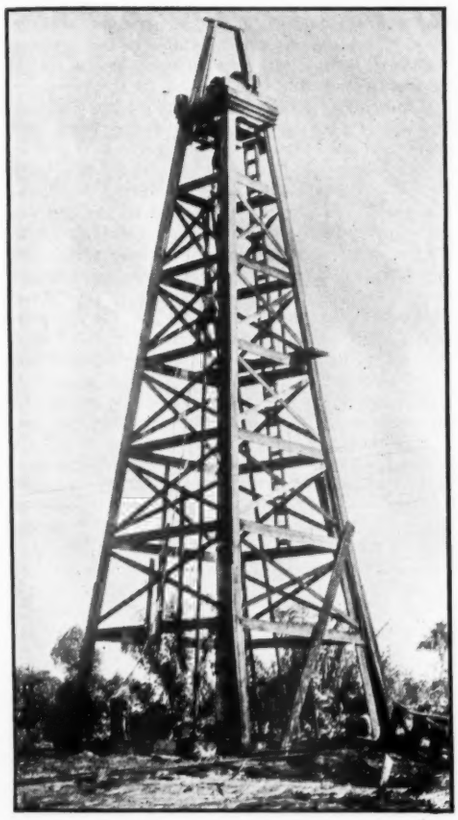
TRINIDAD

Like most of the larger producing countries of the world, Trinidad has been steadily increasing its output of crude oil during the last four years, and already the figures for the first nine months of 1936 are considerably in excess of those reported for the corresponding period of any previous year.

The production of Trinidad increased from 9,561,353 bbls. in 1933 to 11,671,224 bbls. in 1935, when a new record was reached. For the first nine months of this year, the latest period for which figures are available, the crude output was approximately 9,672,000 barrels, representing an increase, over the same period of 1935, of 15.4%. The greater proportion of this increase has been obtained by the two largest producers, Apex (Trinidad) Oilfields, Ltd., and Trinidad Leaseholds, Ltd.,



LAKE THAT PAVED WORLD—*Trinidad, B. W. I., Pitch Lake, world's largest source of asphalt from which over 5,000,000 tons has been taken.—(Underwood)*

which are responsible for approximately 29% and 27% respectively of the island's production, while United British Oilfields of Trinidad, Ltd., and British Controlled Oilfields, Ltd., the next largest producing companies, are producing about 12% and 10% of the total crude oil output. In 1935, Fyzabad, the largest producing area, was responsible for over 55% of the total production of the island.

Trinidad has six refineries, including two Dubbs cracking plants, with a total capacity of 2,366,300 tons per annum. These refineries operate almost entirely on indigenous crude which is transported from the field by pipe lines. As the production has increased so has the refinery intake, and about 95% of the total crude oil production is run to the refineries. The largest refineries are owned and operated by Trinidad Leaseholds, which purchase the entire crude oil production of Apex (Trinidad) and by United British Oilfields of Trinidad, which purchases crude oil from British Controlled Oilfields, Ltd., and Kern Trinidad Oilfields, a subsidiary of Kern River Oilfields of

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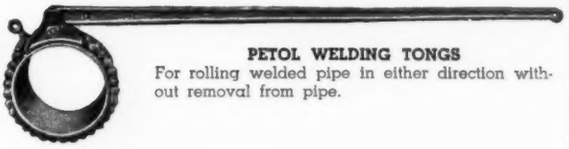

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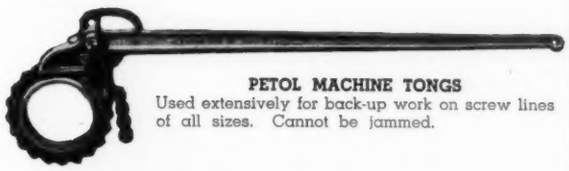

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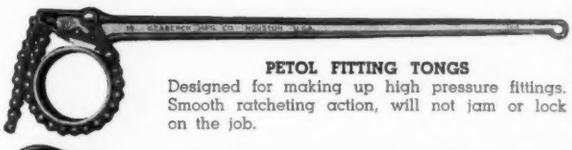

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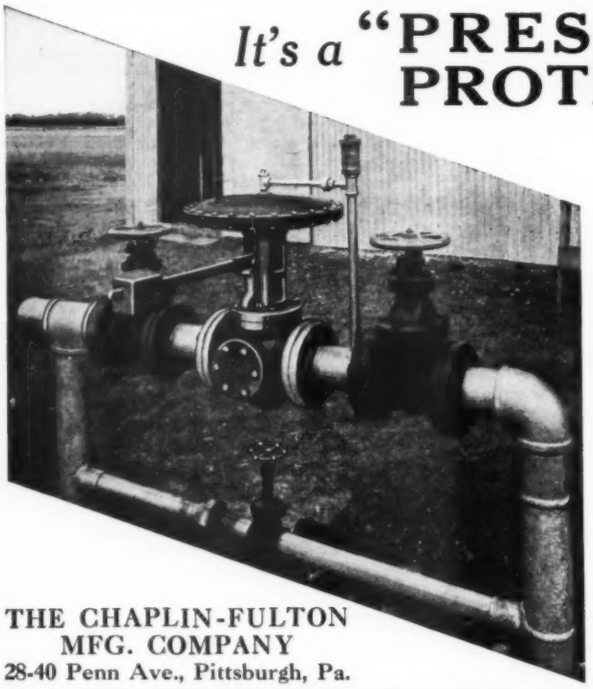

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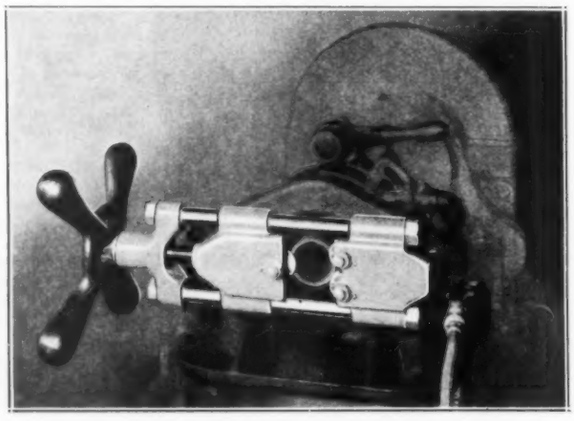

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California, Ltd. The development of crude output, refinery intake and total exports during the past four years is shown in the following table:

	Crude production	Crude Runs to stills	Total exports
1932	10,126,000	7,635,000	9,638,000
1933	9,561,000	9,130,000	8,909,000
1934	10,894,000	10,847,000	9,982,000
1935	11,671,000	11,148,000	10,994,000
1935 (Jan./Sept.)	8,379,000	(Jan./Aug.)	7,260,000
1936 (Jan./Sept.)	9,672,000	(Jan./Aug.)	8,097,000

Exports of crude oil, which are small, and of refined products, together totalled 8,097,000 bbls. for the period January-August, 1936, an increase of 11% over the corresponding period of 1935. Exports now represent about 95% of the crude oil production of the island. Fuel oil provided over two-thirds and gasoline approximately one quarter of the total exports of refined products. The greater part of these exports are shipped to the British Isles and other parts of the British Empire. In order to handle large ocean-going tankers United British Oilfields of Trinidad, Ltd., recently completed a new pipe line jetty, 1¾ miles long, constructed entirely of West Indian timber.

The improved conditions of the island's oil industry are reflected in the chairmens' speeches made at the annual meetings and in the accounts published in the last few months by the larger companies operating in Trinidad. At the recent annual meeting of Trinidad Leaseholds, the chairman mentioned that the fiscal year ended June 30th, 1936, was one of great expansion.

It is interesting to note that there is a good deal of co-operation between producing companies in the island especially in regard to the development of production and drilling. Trinidad Leaseholds, for instance, has made working agreements with Trinidad Central Oilfields, Ltd., to drill and develop the Guapo area and is testing the Wilson area with the option of operating it for the joint account. Further, Trinidad Leaseholds and United British Oilfields of Trinidad have formed and transferred to Trinidad Northern Areas, Ltd., their interests in an area in the north of the island and this company is carrying out an exploration program in this area.

Many of the existing companies are endeavoring to increase their holdings of land in Trinidad while a few new companies are being formed to obtain and develop concessions in the island. In the cases of Kern River Oilfields, Ltd., and Trinidad Leaseholds the need for additional capital has caused these companies to increase their capital this year by £125,000 and £327,890, respectively. (See map on page 59.)

IRAQ

The heavy crude oil produced from the Mosul field of Iraq is being used to produce asphalt for highway construction in the northern part of that country. The old refinery at Qaiyara, constructed about 25 years ago by Germans and rehabilitated in 1936 by the British Oil Development Co., Ltd. owner and developer of the Mosul concession, is to be operated under a year's contract.

When the B.O.D. contract expires, it will be assigned to a native company which the Iraq government intends to form. In this connection, Iraq Corp., Ltd., has ben formed with capital of 105 pounds and is registered for the purpose of acquiring petroleum concessions, refining mineral oils, processing natural gas and other products.

Listed as a director of Iraq Corp., Ltd., is Pasha al Haidari et Hindi Zade Rustem Fehmi Nedjo Bey. While the connection, if any, has not been entirely cleared, it is regarded probable that the Iraq Corp., Ltd., is the company to which the Qaiyara refining contract will pass at the end of the primary period.

The B.O.D.'s concession which includes all of Iraq west of the Tigris River and north of the 33rd parallel of latitude, was previously restricted to approximately its operating fuel requirements. During 1935, the B.O.D. produced only a total of 63,224 bbls. and 38,570 bbls. were used as fuel in the company's operations. Commissioning of the asphalt refinery at Qaiyara probably will give an additional outlet for this heavy crude and will supply material for needed highway construction in northern Iraq.

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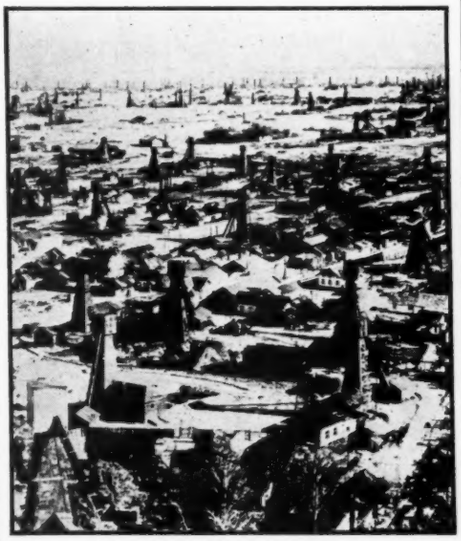
POLAND

Dwindling and expensive production continued to grip the oil industry in Poland in 1936. The government maintained its protective policy toward the domestic industry with the hope that continuous drilling would disclose new flush reserves.

Although government protection maintained Poland's internal petroleum prices at levels permitting a profit to the producers and refiners, the surplus of 10 to 15 per cent above requirements were forced into world trade channels on a competitive basis and virtually nullified the gains possible from interior business. Poland's production for 1936 will total approximately 3,614,980 bbls., or a daily average of 9,904 bbls., against 3,812,970 bbls. in 1935, or 10,446 bbls. daily.



Oil field in Poland.—(International)

More than 65 per cent of Poland's production is derived from the Boryslaw pool in the Drohobycz district where wells produce from about 4,270 feet, the deepest in the country. Although some of the Polish wells are bottomed as shallow as 650 feet, the yield is extremely small and production of 35 to 70 bbls. per month, or from one to two bbls. daily is considered economically sound, In this connection, it is interesting to note that the Boryslaw district's deep wells bottomed at 4,270 feet produce an average of less than 9 bbls. daily. The Boryslaw pool contains about 620 active wells and nearly 250 are temporarily shut down with production too small to justify pumping or with operators too impoverished to purchase replacement equipment.

The Jaslo district, in the counties of Krosno, Gorlice, Jaslo, Brzozow and Sanok is the second largest producing area in Poland. Production from the Jaslo district amounts to about 18 per cent of the country's total and is recovered from depths ranging between 820 and 2,590 feet.

The Jaslo district contains more than 1,150 active oil and gas producers. All wells are pumping or on air or gas lift and the per well daily average production ranges up to 3½ bbls. down to two-tenths of a barrel.

The Stanislawow district, in Nadworna, Peczenizyn and Stanislawow counties, contributes about seven per cent of Poland's production from a total of 255 active oil and gas wells which range in depth from 985 to 4,760 feet. The per well daily average ranges up to 5.5 and down to six-tenths of one barrel.

Oil companies in Poland are operating under the so-called "Polski Eksport Naftowy," which replaced voluntary cartel agreements which expired May 1, 1933. The Polski Eksport Naftowy exercises control over the home market to the end that prices to national consumers are inimical to expansion of consumption.

Excepting in the cases of the small refiners which are permitted to distribute their entire output within Poland, any profit realized from limited sales within the country are more than offset when

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the high cost products are offered in the world's competitive markets. The result under existing conditions is that refiners compelled to seek outside markets for material refined in excess of their domestic quotas are losing nearly as much on 15 per cent of their throughput than they make on 85 per cent sold internally.

INDIA and BURMAH

(Continued from Page 108)

Yenangyaung structure contributed by exploration over the past 10 years gives every indication that the productive area will be extended even beyond the present limits. Horizons from the Middle Eocene to the top of the Olig-Miocene are petroliferous under certain conditions in the Yenangyaung district. The oil sands productive in the various fields grade into marine clays and shales to the south and to freshwater-laden clays and sands to the north. The Yenangyaung field is now producing more than 60 per cent of Burmah's crude. The oil is high gravity and is considered premium material for refining. The field now has more than 3,000 wells and produces about 12,500 to 15,000 bbls. daily. It is electrically operated throughout, including pumping units and drilling rigs. Productivity of the Yenangyaung oil sands is best exemplified by the fact that some of the hand-dug wells in existence before 1885 are still on the active list. The hand-dug wells are bottomed at about 400 feet. Existence of cross faults in the Yenangyaung structure offers the possibility that other productive parts of the structure even further south will continue to maintain Burmah's crude output for several years.

Production was developed in 1930 along the southern side of the Minlindaung fault, which transverses the Yenangyaung structure about a mile south of previous proven limits. The production was encountered at 4,100 feet. Since that time, production a mile further south has been developed from 5,000 feet and further extensions are possible. Also there is nothing to prove conclusively that other similar cross faults along the general ridge structure do not exist. Considerable detailed work with a view to answering the question of succeeding faults to the south is under way.

The acreage immediately south of the Minlindaung fault has become one of the British Burmah Petroleum Co.'s chief reserves in the country and concentrated drilling operations have been carried on there for the past year. British Burmah acquired additional acreage in the Minlindaung fault area early in 1936 from Yenangyaung Oilfield Southern Extension, Ltd. Exploration of the comparatively new territory has increased British Burmah's production 50 per cent at times this year, compared with output in 1935.

Probably ranking equal to, or above the Yenangyaung field from the standpoint of reserves is the Singu-Yenangyat district, which now includes the Lanywa field named after a small Burmese village on the Irrawaddy River. The field produces from sands between 3,000 and 3,500 feet and below a tedious series of water horizons. It is at this point in the chain of Burmah's oil fields that the interesting problem of producing from under the bed of the Irrawaddy River is encountered.

The portion of the field now designated as Lanywa was developed only after the Indo-Burma Petroleum Co. constructed a two-mile apron and barrier protecting the sandbar on which the field is largely confined from the rainy season's flood waters poured into the Irrawaddy. The sandbar is on the northwestern side of the Irrawaddy. The Lenywa field now contains more than 150 wells, producing nearly 3,000,000 bbls. of oil annually. The figures include oil recovered from the Singu side of the field on the southeast side of the river.

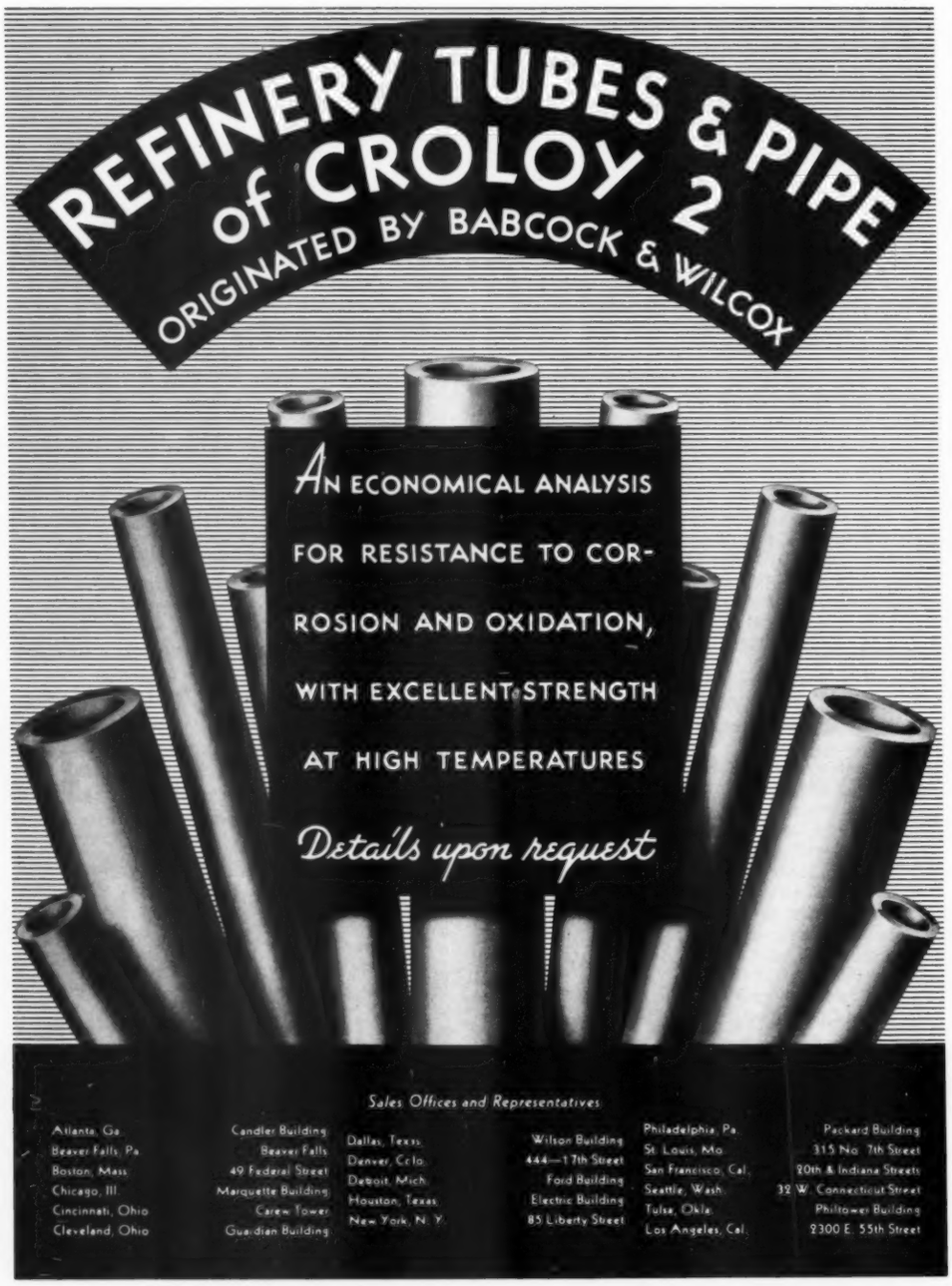
The Burmah Oil Co., which owns drilling privileges in the Singu portion of the field, has extended the mainland a short distance into the Irrawaddy's bed, providing additional locations. On the basis of current information, it seems that the Singu-Lenywa fields are intimately related and that the sand body probably will prove productive under the entire river bed at that point.

After the stream has been narrowed to the limit of navigable requirements, it is evident that companies operating on either side will resort to directional drilling, deflecting holes to the center of the river from either side. This possibility stirs speculation from a competitive standpoint.

Three smaller fields, Minbu, Palanyon and Yethaya, south of Yenangyaung, are of relative slight importance. Minbu is the largest producer of the three small pools and contributes approximately 450 bbls. daily to the country's output. However, the two other fields are of commercial value and are being exploited on that basis, with some of the deeper possibilities either unexplored or not entirely exhausted.

Indaw, the most northern producing field in Burmah, is regarded by students of the country's geology to have interesting possibilities. Production of oil as far north as Indaw came as a distinct surprise to many. Since only shallow horizons have been explored and under the handicap of heavy gas pressures, unhealthy climate and distance from supplies, geologists familiar with Burmah feel that deeper drilling there may yield important results. The field is served by a pipe line of 22 miles to Pantha on the Chindwin River, where the oil is refined and the products distributed by water to the northern Burmah market. Production averages between 350 and 450 bbls. daily from the shallow sands so far explored.

The small fields of Yenanma and Padaukbin, south of Minbu on the Irrawaddy River, produce a relatively small quantity of oil, but like the other small fields in that general vicinity, are considered to have economic significance. The Assam Oil Co., Ltd. (Burmah Oil Co., Ltd.) has India's most important production in the Assam district near Digboi, which accounts for approximately 1,000,000 to 1,500,000 bbls. of crude annually. India's other productive spot is in the Punjab, 42 miles southwest of Rawalpindi. The field, operated by the Attock Oil Co., Ltd., produces several thou-



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sand barrels of crude yearly. This is moved through 42 miles of 4-inch line to the refinery at Rawalpindi. Products, mostly kerosene, are distributed in the local market.

The largest pipe line carrier in Burmah is the 10-inch trunk system operated by the Burmah Oil Co. from Yenangyaung field to Syriam on the Rangoon River, a distance of 300 miles. The Singu field is linked to Yenangyaung by an 8-inch line and a 4-inch artery serves the Yenangyat field, about 20 miles farther north. As indicated by the terminal point of the Burmah pipe-line system, Rangoon and its vicinity are the country's refining center, although the Assam plant at Digboi has a rated capacity of 6,000 bbls. daily with cracking facilities for handling 1,600 bbls. daily.

The largest refinery in that part of the world is that of the Burmah Oil Co., Ltd., at Rangoon, which is a complete system with capacity of 20,000 bbls. daily. A Dubbs cracking unit of 3,000 bbls. daily capacity is incorporated in the refinery setup. The skimming plant of the Attock Oil Co., Ltd., at Rawalpindi is designed to handle 1,500 bbls. daily.

The Indo-Burma Petroleum Co., Ltd., has one refinery at Seikgyi, on the Rangoon River, with 3,000 bbls. daily capacity and one at Kindat with 1,000 bbls. capacity. South of Rangoon, at Thilwa, United Refineries, Ltd., operates a 500-bbl. skimming plant.

IRAN

Drilling depths of 10,000 feet or more were proven practical and within reasonable time latitude in Iran during the year. The all-time depth record for areas east of the Suez Canal was established in April, 1936, when Anglo-Iranian Oil Co., Ltd., No. 2 Pirgah reached 10,026 feet where the hole was ordered abandoned. The No. 2 Pirgah, first test in Iran to reach five figures, was drilled in the Zeloi area, north of Pirgam.

Four previous tests had been drilled in the area, but none had progressed below 5,655 feet until No. 2 Pirgah reached beyond that point in less than four months. Operators set 8,022 feet of 6¼-inch casing requiring four days and frequent use of the mud pumps to wash ahead of the pipe. Below 9,000 feet, 3½-inch flush joint drill pipe was used to drill the last 1,026 feet. The drilling depth record for Iran and that part of the world east of the Suez was established by Anglo-Iranian crews under Temple-Watts, drilling superintendent.

West Texas Bulletin

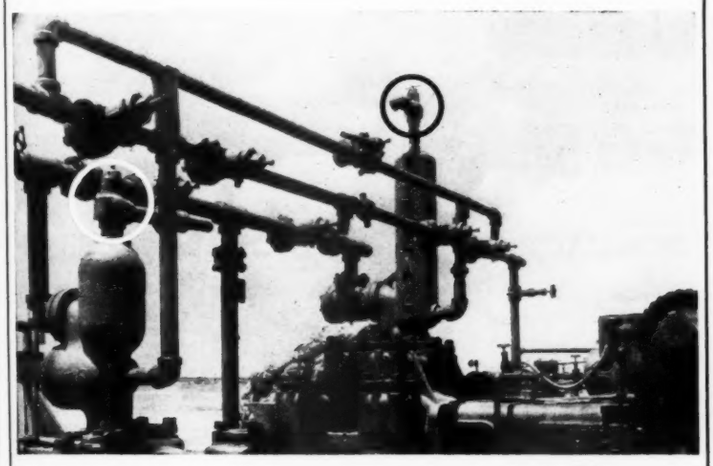
Charles B. Carpenter and Harry B. Hill, engineers of the Dallas, Tex., office of the U. S. Bureau of Mines, have recently completed R. I. 3,316 covering the oil fields of West Texas and southeastern New Mexico and it is ready for distribution. This is a very complete report on some of the oil fields of this region and has been published through cooperative assistance of the Midland, Tex., Chamber of Commerce.

Yates, Hendrick, Church-Fields, McElroy, Big Lake, Big Spring, Penn and Westbrook fields in Texas and Hobbs in New Mexico were selected. Complete data on each is included. The report contains 223 mineographed pages with 40 illustrations, and is available from the Information Division of U. S. Bureau of Mines, Washington, D. C., or the Chamber of Commerce, Midland, Tex.

Michigan Association

MUSKEGON, Mich.—Eleven directors were elected by the Oil & Gas Association of Michigan at the fourth annual meeting in Mount Pleasant. Those chosen for two years were: Howard D. Atha, retiring president; E. A. Butterfield, T. E. Cain, W. P. Clarke, Dr. Virgil R. D. Kirkham, Charles L. Maguire, W. A. Thomas, W. B. Pardoe, George B. Talbot, Fred W. Turner and Charles Smith, Jr.

The board will elect its officers later. In his annual report President Atha said he would not be a candidate for reelection as president, a post he also held for six years in the Ohio Oil & Gas Association.

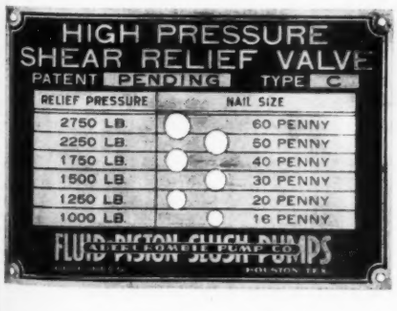


Around the World they're Protecting

PUMPS and PUMP PARTS

You know the tremendous cost involved in a blown up fluid end of a pump . . . or even a rotary hose, or any one of many expensive pump parts subject to the hazards of over-pressure. Compare such costs to the cost of a common wire nail, which is the only part of the Abercrombie SHEAR-RELIEF Valve damaged when this valve releases excess pressure by shearing the nail. It's a rare comparison, but SHEAR-RELIEF Valve users all over the oil world know it's a fair one.

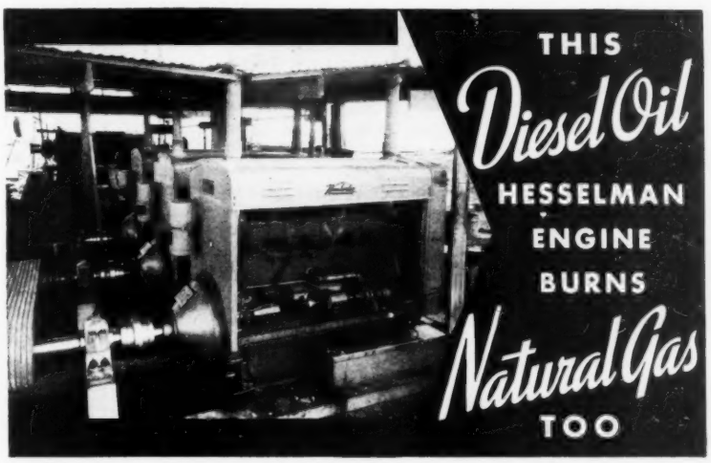
Full details sent upon request.



High Pressure Type, for Slush Pumps

Details of operation of the SHEAR-RELIEF Valve are right on the name-plate, so you can't go wrong in setting it. Notice the relieving pressures, and the size nail which shears at each pressure. Notice also the nail gauge which eliminates any chance of mistaking nail size. Notice, too, the simplicity of inserting the nail on the SHEAR-RELIEF Valve shown above.

FLUID-PISTON SLUSH PUMPS
ABERCROMBIE PUMP CO.
GULF BLDG. HOUSTON TEX.



This triple engine hook-up rig is one of four rigs owned by the Blackstock Oil & Gas Co., Oklahoma City, that are equipped with ten Model EKH 190–195 hp. Waukesha-Hesselman Oil Engines.

The Hesselman is an engine that burns diesel fuels but here it is operating with gas because it is plentiful and cheap. The low compression of the Hesselman Engine makes it suitable for either fuel—an advantage not found in high compression Diesel engines.

The owners have drilled wells up to 7,000 feet. The three Hesselman Engines use about 75,000 cu. ft. of gas daily. Gas has proved equally satisfactory as to economy and performance . . . and as good or better time has been made than with steam rigs.

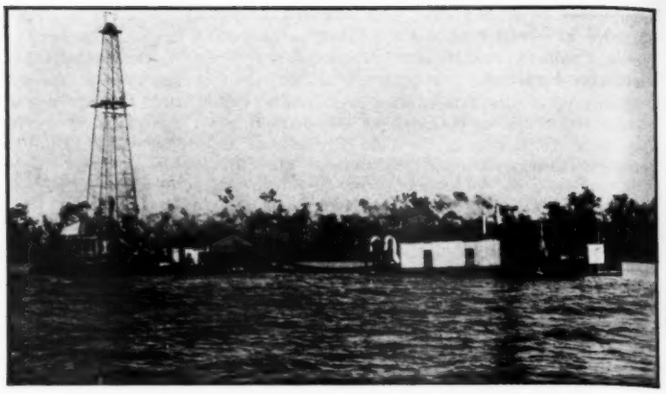
To convert this Waukesha-Hesselman from an engine burning diesel fuel to a gas engine, it is only necessary to install gas burning accessories in place of the fuel oil equipment—pistons, valves, cylinder heads, connecting rods, crankshaft, and bearings remain exactly the same.

Here's the reason—the Hesselman is a solid injection oil engine with electric spark ignition which permits compression ratios low enough and exactly suited to natural gas. Its ignition is definitely timed so that the combustion is under full control regardless of load, speed, or the character of the fuel itself. For wildcatting or in proven fields, this Hesselman is the ideal rig.

Write today for Bulletin 1045. *Waukesha Motor Company, Waukesha, Wisconsin.*

WAUKESHA ENGINES

East Venezuela Offers Problems in Operations



Diesel-electric drilling unit operated by Standard Oil Co. of Venezuela on submerged land in Pedernales (Amacuro) district

VENEZUELA

Drilling and operating problems in eastern Venezuela vary widely due to the many different varieties of terrain and subsurface strata encountered. In the swamp area of the Orinoco Delta, an operator from the tidelands of Louisiana or Texas would feel very much at home, but only a short distance inland conditions more closely approximate those of West Texas. A third condition is presented in the Quiriquire area, which is at present the principal source of production in eastern Venezuela. Here heavy rainfall provides adequate water supply, but the extremely rough and broken character of the Anden foothills, together with the dense growth of the tropical rain-forest which covers them, makes road building and the construction of surface installations a task of no mean proportions.

The development of the Quiriquire field, which was discovered in 1925, progressed rather slowly until 1930. Early drilling had been confined to the heavy oil area about the discovery well, and the resultant 15° gravity crude was not in demand at that time. In June 1930, however, a step-out well about 2 miles east of the original discovery, opened the main Quiriquire field which produces 18-19° crude, and development has been pushed since that date.

Since the proven territory is all under concession to one operating company, it has been possible to develop the field in accordance with modern engineering principles and make the best use of the rather limited reservoir energy available. Every effort has been made to drill up the field on the most economic well spacing and produce it at a rate which will yield the maximum recovery.

The producing formation is a non-homogeneous unconsolidated conglomerative mixture of fine and coarse sand, cobbles and small boulders, interspersed with sandy shale and shale. It is difficult to drill with any type of bit, and even more difficult to core. Several types of drag bits have been tried out without success, and present practice is to use roller-type rock bits.

An interesting feature in the development of the Quiriquire field is the use of twin wells at many locations. The producing formation varies in thickness, and this section is made up of a series of shale-separated lenticular beds which vary in the gravity contained, in gas oil ratio, in water content, and in other factors which affect productivity. Consequently, the inclusion of these numerous beds in one producing well presents many possible operating difficulties, such as water intrusion, gas migration and the proper production control of the various component sands. To reduce these difficulties, it was decided to divide the section between two twin wells, the first being drilled through the entire section and setting casing at a convenient middle point, the rig skidded some 30 feet, and the second drilled to include the upper half of the producing formation. This practice has worked out very satisfactorily. In various cases, one twin has been invaded by water or gas without effect on the other, and at one location the lower twin is used as a repressuring input well while the upper twin is on production.

The oil produced is of unusually low viscosity for a gravity of 18-19° A.P.I., averaging approximately 300 seconds Saybolt Universal at 100° F., which simplifies gas separation. Production control is based on observed subsurface pressure decline, and gas oil ratios, a combination which insures producing efficiency, and all flowing wells are produced through chokes to control the back-pressure on the producing formation.

The produced oil is collected at a number of gathering stations located at suitable low points about the field, and thence pumped through 8" and 10" mainlines to Caripito. At this point, a portion of the oil is refined and the remainder loaded out either on shuttle tankers for the sea-loading terminal located at Guiria, or on deep sea vessels for export.

The petroleum industry is training Venezuelans to handle many phases of development work and has done a great deal to promote the general welfare and raise the standard of living for the average inhabitant of eastern Venezuela.

In an area where the virgin jungle formerly held sway with only a few scattered plots of cultivated ground, and an occasional village of palm-thatched mud huts, you will now find communities of healthy, and prosperous workmen, who live in modern sanitary tile houses constructed by the company, and supplied with pure water for drink-

(Continued on Page 121)

REGISTERED TONNAGE OF WORLD'S OIL TANKERS

At the end of June, 1936, the total world tanker registration was 9,195,421 tons and of this tonnage 5,119,488 tons was steam propelled, and 4,075,933 tons motor propelled, not counting boats smaller than 1,000 tons.

Lloyds register	Tonnage
1914-15	1,478,988
1919-20	2,929,113
1920-21	3,354,314
1921-22	4,418,688
1922-23	5,062,699
1923-24	5,203,601
1924-25	5,243,238
1925-26	5,384,290
1926-27	5,664,786
1927-28	5,915,677
1928-29	6,620,028
1929-30	7,071,015
1930-31	7,627,904
1931-32	8,650,141
1932-33	8,911,258
1933-34	8,863,012
1934-35	8,776,009
1935-36	9,008,972
1936-37	9,316,266

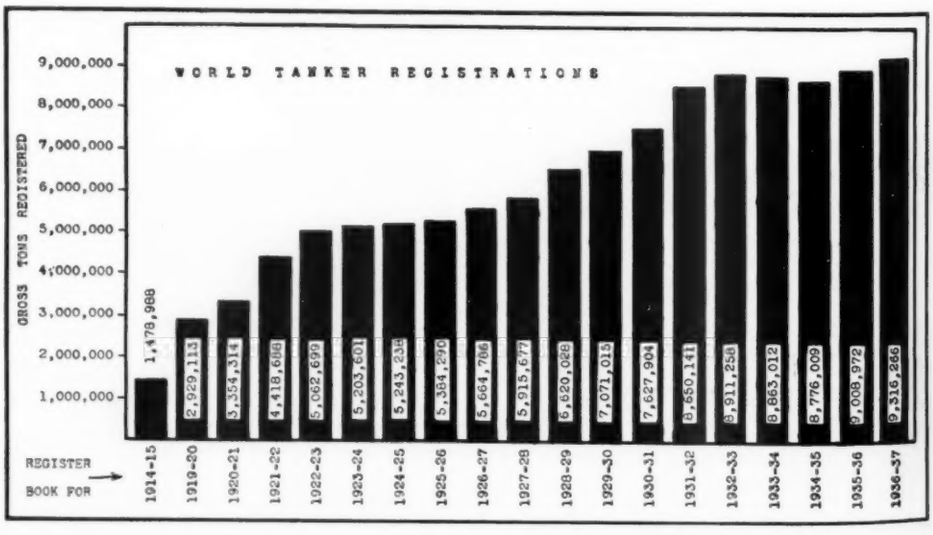
American, British and Norwegian tankers follow:

	1936–37		1935–36	
	No.	Tonnage	No.	Tonnage
U.S.A.	388	2,489,725	388	2,491,368
England	372	2,314,052	379	2,313,344
Norway	229	1,657,782	221	1,564,557

Of all tankers registered 44.4 per cent have motors, while on all boats, tankers included, only 19.2 per cent have motors.

	Percentage classified by power	
	1936	1914
Coal fired	49.10	88.84
Oil fired	30.38	2.65
Internal combustion engine	18.89	0.45
Sail boats	1.63	8.06
	100.00	100.00

There were 1,946,000 tons of vessels of all kinds under construction November, 1936, with 61 per cent motor driven or 1,184,231 tons. These figures cover boats actually under construction and do not include vessels ordered but for which keels have not been laid.



Happy NEW YEAR

HAPPY MULTI-FLEX CORD

WE are indebted to the Oil Industry for the success we have made and wish to thank our many friends and wish them a Prosperous and Healthful 1937.

HAPPY MULTI-FLEX CORD
HAPPY STRAIGHT EDGE
HAPPY PLI-CORD
HAPPY INNERSTITCHED

All four made by the Continuous Vulcanization Process—uniform thickness, every inch vulcanized perfectly.

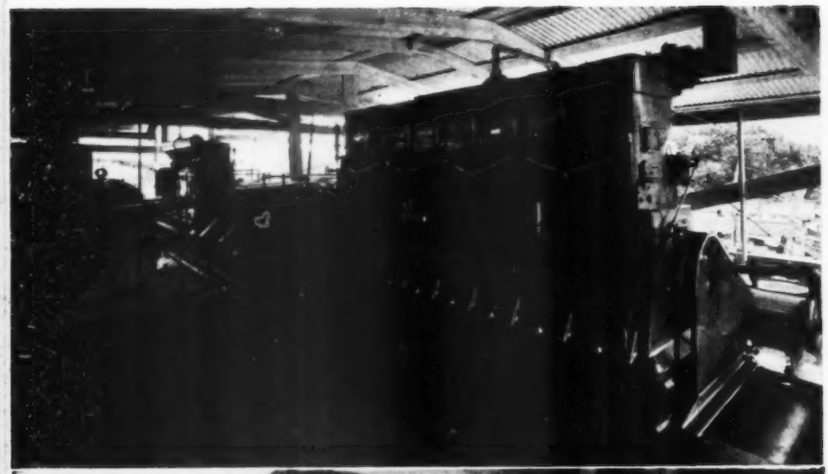
BEGINNING 18 *YEARS OF SERVICE*

Happy BELTING COMPANY

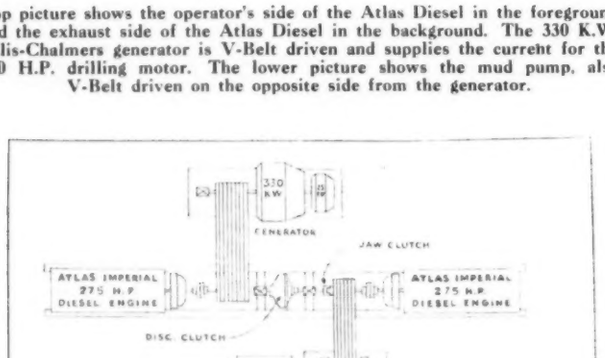
310 EAST TENTH STREET, Tulsa, Oklahoma

All Happy Belts are manufactured by the Boston Woven Hose and Rubber Company, patentees, owners and operators of the exclusive continuous vulcanization process.

Here's Performance!



Top picture shows the operator's side of the Atlas Diesel in the foreground and the exhaust side of the Atlas Diesel in the background. The 330 K.W. Allis-Chalmers generator is V-Belt driven and supplies the current for the 400 H.P. drilling motor. The lower picture shows the mud pump, also V-Belt driven on the opposite side from the generator.



The drawing above illustrates the hook-up employed in the installation pictured at the top. Other hook-ups are shown in our new bulletin "Atlas Imperial Diesels for all Oil Field Service." A copy will be mailed to you on request.

with 3 week's handicap Atlas Diesels finish first!

Here is an Atlas-Richards Drilling Rig, owned by the R. B. Fields Drilling Company of Oklahoma City, shown drilling a deep well for the Blackgold Refining Company.

The Atlas Diesel powered rig went into service three weeks after other wells for the same company were started, and it completed its well 893 feet ahead of all other drilling units using steam or purchased electric power.

That's the type of performance every drilling contractor wants, and Atlas Diesels are the types of engines that make just such records. Originally designed to take the beating that the heavy construction industry gives its equipment, they are setting up new records in their adaptation to oil well drilling.

Atlas Diesels provide the power and flexibility of a steam rig at a fraction of the operating cost. They eliminate the water problem incident to steam, are readily portable as complete units, and the setup time is negligible.

Hook-ups can be arranged to meet your specific requirements. You may have straight mechanical, all electric, or combination electric-mechanical hook-ups. Five variations are illustrated in our new bulletin "Atlas Imperial Diesels for All Oil Field Service." Write for a copy today.

SEND FOR A COPY OF OUR BULLETIN "ATLAS IMPERIAL DIESELS FOR ALL OIL FIELD SERVICE"

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND, CALIFORNIA · · MATTOON, ILLINOIS

Oil Country Distributors

K. S. RICHARDS
143 N. ROCK ISLAND, WICHITA

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SOUTHERN ENGINE AND PUMP CO.
HOUSTON

ATLAS IMPERIAL

France Completes Refinery Program Projected in 1928

FRANCE

The year has seen completion of the refinery program which was projected by the legislation of 1928. Two new refineries: "La Raffinerie de la Compagnie Francaise de Raffinage" at Martigues and "La Raffinerie de Pechelbronn Quest" at Donges have now started regular production. The quantity of crude oil worked per annum now exceeds 6,000,000 tons, and today it can be said that France has become a country whose oil supplies are based mainly on the import of crude oil in place of finished products.

Estimated final import figures for 1936 show: Crude oil imports, 5,750,000 tons; finished products, 1,260,000 tons.

All those technical difficulties have been experienced in France which are attendant on the erection of a national refining industry in a country which formerly imported finished oils. These difficulties have been enhanced in France by the fact that stress has been laid on the importance of supplying the refineries with crude oil from Iraq, a source of supply to which the French government attaches a special significance both from the point of view of its geographical situation and also because of its own financial interests in the Iraq oil fields.

Most of the crude oil from Iraq which came into production in 1935 is now treated in France. For 1936 the quantity is estimated at more than 3,000,000 tons.

The "optimum" yield of 1 ton of crude in its different fractions never corresponds exactly either in quality or quantity to the commercial consumption of those fractions. In order to obtain the "optimum" yield, it is necessary to work in the same refinery different qualities of crude. This is a matter of some difficulty in refineries of small capacity, which are compelled to take Iraq crude as their chief raw material for treatment. For this reason, France is today compelled to import nearly all her aviation spirit, a considerable quantity of gas oil and certain grades of lubricants and greases.

The manufacture of motor spirit of an ever-increasing octane number, which is now required in France, as in other countries, adds to the difficulties attendant on this enforced offtake of crude from Iraq.

In addition to these problems which are inherent in the industry, there are now further difficulties facing the French oil industry, some of an economic, others of an administrative nature. It is a curious reflection, in considering these various difficulties, that in France today there is one policy striving to develop a national refining industry operated with imported crude oil side by side with another policy working in exactly the opposite direction.

The general economic conditions in France have been bad during the whole of 1936 and have affected very adversely all national industries. In particular, the development of motor traffic has been checked and the automobile manufacturing industry has suffered in consequence. The extremely heavy taxes imposed upon motor fuel have still further accentuated the effects of the industrial crisis. Actually, the consumption of gasoline, which had progressively increased in previous years, remained stationary in 1936.

At the same time, compulsory and ever-increasing quantities of alcohol were forced upon the gasoline distributors. This alcohol is taken over from the producers at a price far higher than the price at which it is sold as a motor fuel, and a special tax on gasoline pays for this difference.

Finally, under government auspices two small factories for the manufacture of synthetic spirit from coal have been erected. The cost of production of this manufactured spirit is disproportionately high and it is compulsorily sold at this price to the petroleum distributors.

The natural result of this policy is an increase in gasoline prices to the consumer. Thus, not only are substitutes like alcohol and synthetic benzine displacing natural oil products, but it is the natural oil products which have to pay, by increased selling prices, for the uneconomic cost of production of such substitutes.

Finally, although the government's avowed policy was to reserve for the refineries all the available markets for oil in France, in actual fact, encouragement has been given to the small importer whose numbers have increased considerably and who are responsible for a very large proportion of oil imports into France. The refineries, therefore, have lost a number of markets which normally would be included in their total. The position today is that, although some of the refineries are not actually producing up to their authorized capacity, the total output of the French refining industry is greater than its available markets can absorb. In fact, it was necessary at one period in 1936 to reduce by 10 per cent the authorized output.

Such an anomalous state of affairs cannot continue without seriously prejudicing the new industry, and it is to be hoped that measures will soon be taken to redress the situation. The general situation in France ought to permit of some optimism when envisaging the future. France possesses a powerful automobile industry and a well developed and noteworthy road system. The number of automobiles per population is comparatively low. It would only be necessary, therefore, to lower the artificial barriers and especially the rates of gasoline taxation, to bring about an immediate revival in automobile circulation and construction and, as a natural consequence, the oil industry's markets would again resume their upward progress.

It seems possible that the recent devaluation of the franc may have made it possible at last to break the vicious circle of taxation and consumption. The French government, in order to avoid an increase of internal prices, has decreed certain reductions in the taxes on benzine and gas oil. If this measure is the prelude to further tax reductions, but only if this is so, the oil industry in France may hope for better times.

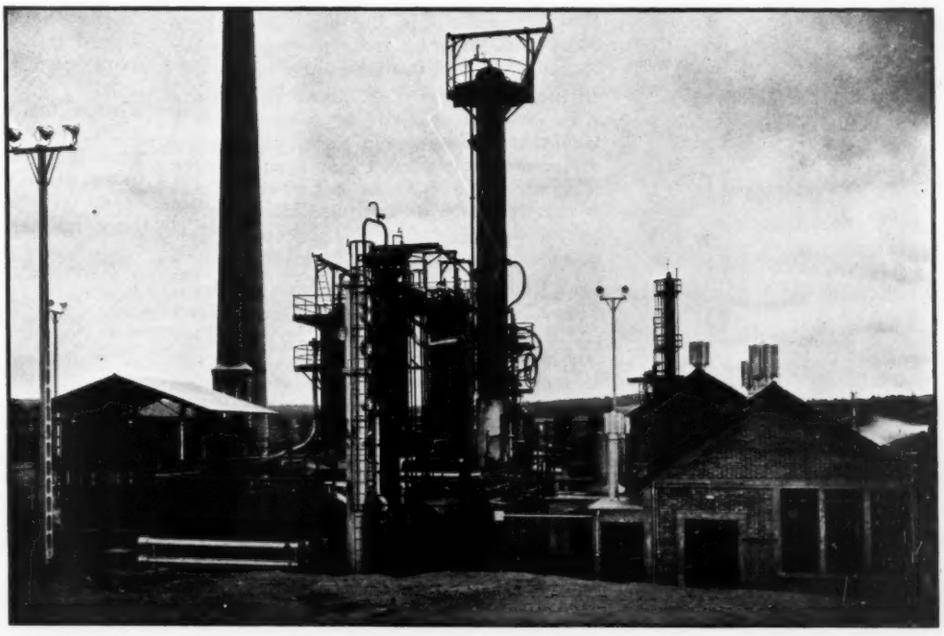
Production of crude in France in 1936 is estimated at approximately the same figure as for 1935, at about 77,000 tons. To this figure is to be added that representing the production of shale oil, of several thousands of tons, and the result demonstrates to what extent France is still dependent upon foreign countries for its supplies of liquid combustibles.

The French fuel supply policy, based as it is upon the act of 1928 providing for the customs control of petroleum products and of the refining of crude oil in France, is already sufficiently well known to make unnecessary any further discussion here.

Suffice it to say that the main consequence of the policy in question has been to bring about the erection, and the placing in operation, of 15 refineries: the most recently constructed began working in 1935. From the point of view of supplying France's requirements, the utilization of these plants has been the cause of some thoroughgoing modifications in the sources of supply.

Instead of importing derivatives, as was formerly done, France is more and more bringing in the crude itself, for treatment in its own refineries, with a view to supplying the domestic market with the various petroleum products. Again, the fact that certain new oil fields in which France has an interest (particularly the Iraq fields) has also had the effect of changing the face of things as regards imports of crude.

As the statistics for 1936 have not yet been prepared, the following figures have to do with



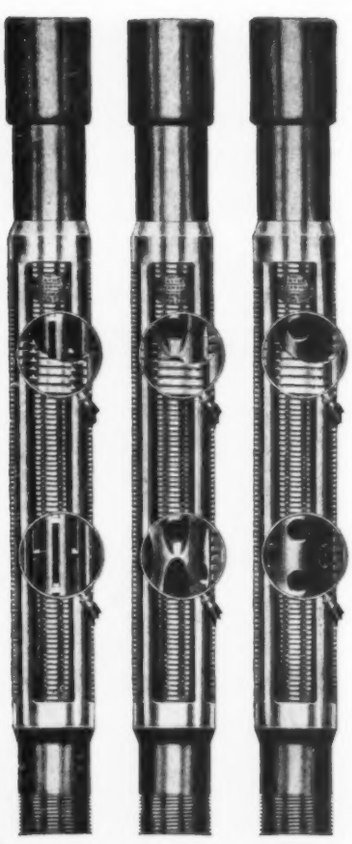
800-bbl. cracking unit in France

THE LAYNE

SCREEN AND PACKER

—have a well-defined and highly recognized reputation

FOR UNFAILING PERFORMANCE AND UNSURPASSED EFFICIENCY



Slotted Type *Milled Type* *Drilled Type*

THE LAYNE SCREEN

Layne Wire Wrapped Screen gives the well the protection it deserves.

The wire is a fraction smaller on one side than the other, so when the small side is wrapped next to the pipe, the openings between the wires flare toward the perforations in the pipe. This type of opening offers a freer passageway for the fluid and eliminates clogging.

In the construction of Layne Screen the wire is not raised or elevated but wrapped solid on the pipe, each wrap under the same pressure and with proper tension. This type of construction assures not only a more uniform gauge, but a strong and rigid screen for all types of wells and whipstock jobs.

The Layne Screen is available in three types: The Milled Groove; Plain Drilled and Slotted Type. It can be furnished on any kind or size pipe, up to 16 inches in diameter, with any number of perforations per foot. Openings between the wires range from 4/1000 of an inch up to any desired gauge.

Layne Wire Wrapped Screen can be furnished with either Brass Wire, Bronze Wire; Galvanized Steel Wire; Nickel Steel Wire and Stainless Steel Wire.

THE LAYNE PACKER

Our Improved Screw Thru Ratchet Packer can be set with tubing or drill stem.

In setting this Packer the weight of the drill stem or tubing forces the sleeve down over the stem, and is held in place by internal ratchet threads in the sleeve and external ratchet threads on the stem. The canvas is forced outward and downward to almost iron hardness—approximately 20 inches long.

This extra long canvas wrapping assures greater contact on the well casing, and a pack that does not require fingers or slips to prevent it from creeping up, when exposed to high pressure.

This Layne Improved Ratchet Packer is made in 3 types; All Canvas; Lead Cone & Canvas; Double Seal.

The Layne Setting Tool is fool proof—lubricated and easy to operate.

It has right hand threads—no picking up to release setting dogs.

To release the tool from the packer, rotate the stem 11 turns to the right. As the setting strings are lowered about 8 inches, a shoulder on bottom of the stem forces an expanding bushing down from under the threads on the bottom and disengages the tool from the packer. Then full weight of setting string is lowered to force the packer sleeve down and expand the canvas.

Setting Tool *Packer*

only the first ten months compared with the corresponding data for 1935: (tons.)

	10 months 1936	1935
High-grade gasoline	379,111	384,995
Regular gasoline	98,023	92,047
Kerosene	1,479	8,375
Gas oils	141,848	102,561
Fuel oils	334,855	258,267
Lubricating oils	79,551	88,526
Vaseline and paraffin oils	1,021	477
Paraffin	503	588
Road oils	13,177	20,162
Asphalt	4,050	3,936
Flooring and paving blocks	359	505
Petroleum coke and hard tar	24,213	21,928
Resin	38	19
Total (refinery products)	1,078,223	982,380
Crudes	4,825,740	4,589,333
Total (crude and refinery products)	5,903,963	5,571,713

This means an increase of more than 300,000 tons for the current year. As regards the importation of derivatives, we find an increase of about 90,000 tons.

Iraq and the United States stand at the head of the list of countries from which the supplies are drawn; the former furnished 2,515,000 tons of crude and the latter 1,137,000 tons of products including 800,000 tons of crude. Rumania occupies third place; the position of that country in the oil market has been strengthened since the beginning of its convention with France in 1936; it imported 118,000 tons more of products during the first ten months of the year than it did in the course of the same length of time in 1935.

Thanks to the creation of a domestic refining industry, France has taken a place among the countries exporting petroleum products. In 1930 its exports were nil, whereas during the first ten months of 1936 the volume of exports of oil products reached 341,303 tons.

The above data give but an inaccurate idea of the French consumption of petroleum products. A point not to be overlooked is the circumstance that an act of parliament was passed during 1936 increasing the quantity required to be kept in storage: it was formerly an amount equal to three months' consumption, and is now equal to four.

A further point to note is that as a result of the passage of laws requiring the use of a 'carburant national" or domestic fuel formed by a blend of alcohol and gasoline, something like 300,000 tons of fuel alcohol have been consumed in French auto engines in the course of the first ten months of 1936.

As far as the search for petroleum sources in France and in the colonies is concerned, the Office National des Combustibles Liquides, in cooperation with the Compagnie Francaise des Pétroles and the various local colonial governments, has continued to carry on its exploratory operations. While some very definite indications of the existence of oil deposits have been brought forth, the experimental borings so far made have failed to reveal the existence of the product in paying quantities.

So far, the most important oil indications have been found in Morocco, Madagascar and the Gabun colonies. There is a good probability that in consequence of the increasingly active carrying on of prospection drillings, some specific information will be forthcoming within a comparatively short time, concerning the quantities of oil likely to be found in these various regions.

Authorization to acquire mining rights and property in all French Indo China insofar as they concern mineral oils, gas, bitumen, asphalts, schists and bitumenous compositions has been extended to Societe Generale de Prospection.

The Societe de Prospection, incorporated in Paris with a capital of 900,000 francs is believed to be a subsidiary of the Societe d'Estudes et d' Exploitations Mineres de l'Indochine, which owns and operates mines in Laos and Tonkin. Privilege to acquire lands falling under the described classification was extended by decree dated early in 1936.

Industrial Use Expanding

The managing committee of the industrial gas section of the American Gas Association of which Ralph Manier, industrial engineer with the Syracuse Lighting Co., Inc., Syracuse, N. Y., is chairman, is discussing ways and means for promoting the wider use of gas in factories and commercial establishments. The use of gas in industry has been increasing steadily to the point where more industrial gas is being sold today than during the previous peak year, 1929.

EAST VENEZUELA

(Continued from Page 116)

ing and bathing purposes. Their medical needs are looked after by competent doctors in a complete and modern hospital, and as a result of health and good food they are developing into a sturdier race than was possible under the old fever-ridden conditions.

The oil companies provide schools for the new generation, and trade schools for the numerous employes who are learning to make their way in a new mechanical world of which their fathers knew little. In the Quiriquire field, Venezuelan employes now drill all wells, produce them, operate gathering stations and pipe lines, and man the local tankers. Training classes are also conducted in drafting, typing, bookkeeping, and other varieties of clerical work, which permit any Venezuelan employe with basic ability to prepare himself for an advanced position in the operations of the oil industry.

Anaconda Oil Board

CALGARY, Alberta.—Shareholders of Anaconda Oil Co., Ltd., at the annual meeting elected the following directors: J. T. Atkinson, A. C. Johnson, Jas. R. Hammill, Major A. C. Landale, A. J. Scott, all of Calgary; Dr. Robert MacKenzie of Vancouver and O. L. Reinecke of Claresholm, Alberta.

USE CARBON

THE CORROSION RESISTANT MATERIAL OF CONSTRUCTION

Highly resistant to the action of acids, alkalies and solvents . . . High thermal conductivity and low coefficient of expansion afford high resistance to thermal shock . . . Mechanically strong—Infusible—Good electrical conductivity.

CARBON BRICK and Special Carbon Shapes

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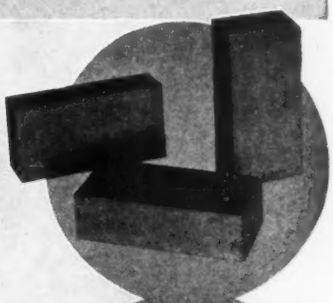

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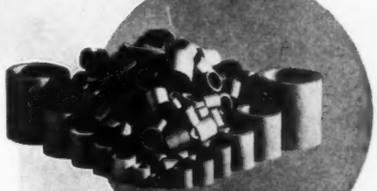

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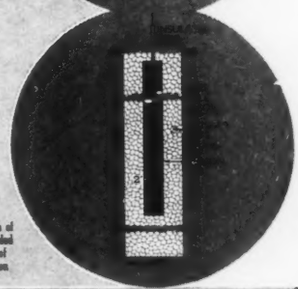

Illustration of recommended method of installation

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Expansion of Exploratory Work in Netherland East Indies

FAR EAST

Expansion of the exploratory program by all interested companies in the Dutch East Indies and Sarawak probably will be launched in 1937 to increase the islands' supplies commensurately with market requirements and to replenish reserves which are in various stages of depletion. Fields in the Dutch East Indies which have been producing for 27 to 51 years, however, contained sufficient productive locations within proven limits or in unexplored step-out territory to feed a normal development program in 1936.

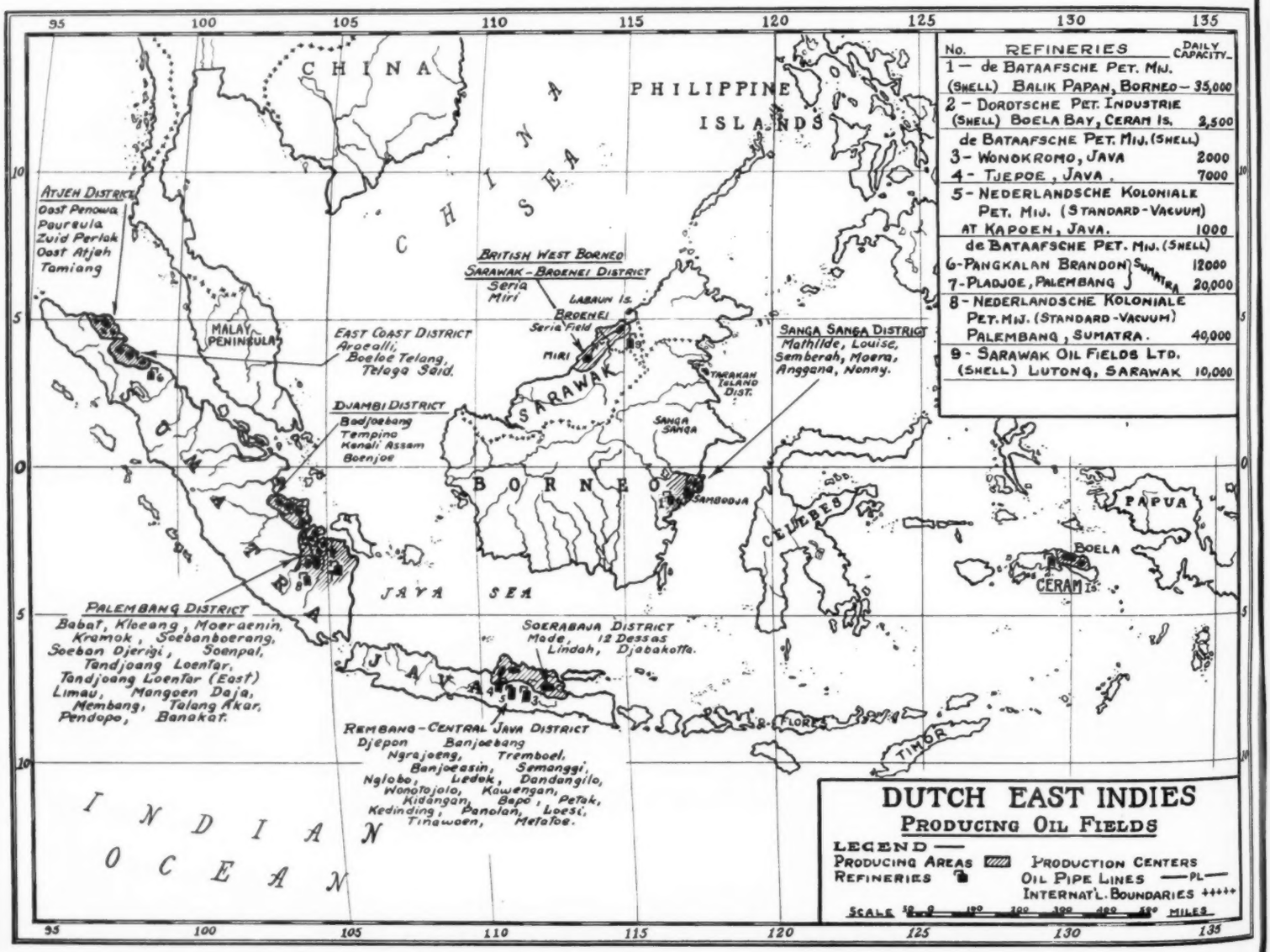
The N. V. de Bataafsche Petroleum Maatschappij (Shell) and Nederlandsche Koloniale Petroleum Maatschappij (Standard-Vacuum) continued their relative positions as producing units and refiners in the Dutch East Indies in 1936. The term "Dutch East Indies" includes Sarawak, or British Borneo. Production for the first 10 months of 1936 totaled approximately 39,754,688 bbls., or 130,772 bbls. daily. About 40,000 bbls. daily is produced by N.K.P.M., the Standard-Vacuum operating unit, and the remainder is recovered by the B.P.M., Shell unit. Total production for 1936 will be approximately equivalent to 1935 recovery, which was 50,902,000 bbls., or a daily average for the entire year of 131,133 bbls.

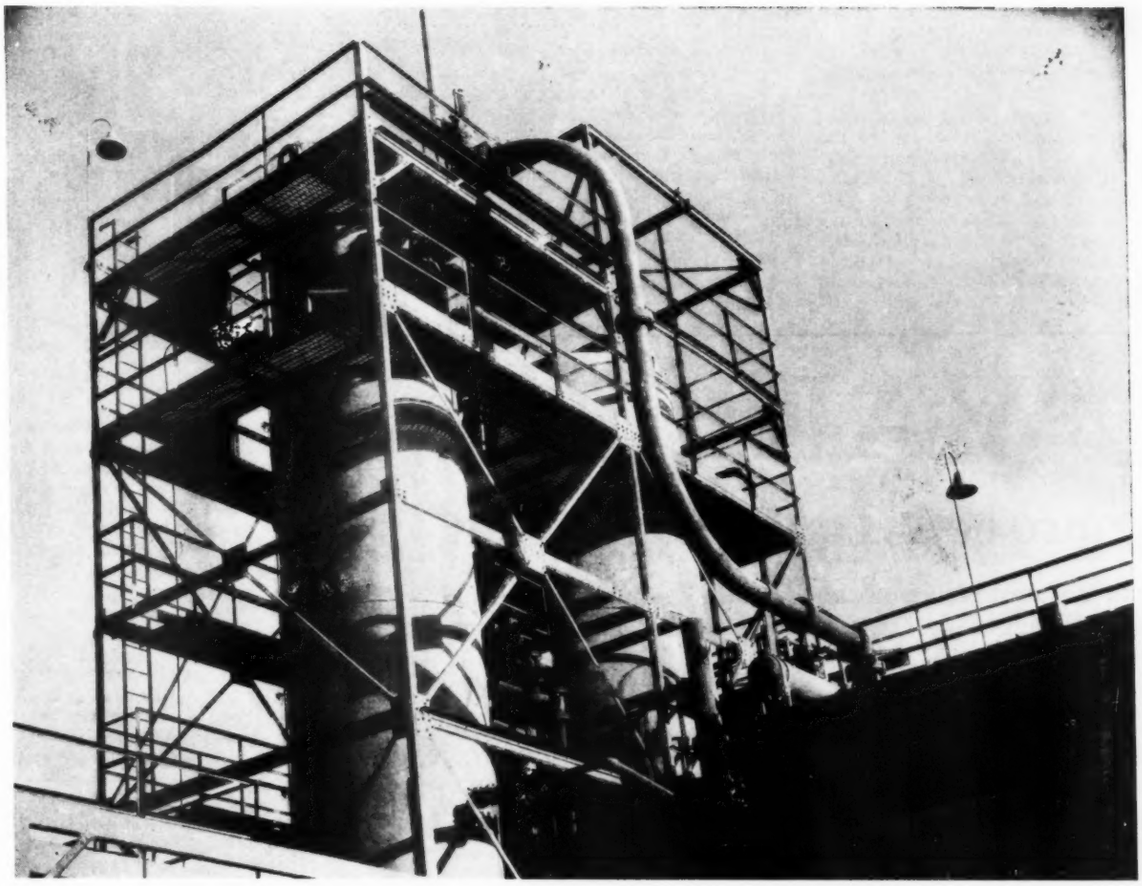
The normal drilling program of about 150 wells a year has been maintained in addition to the relatively small number of failures drilled in previously unexplored territory in various parts of Java, Borneo and Sumatra. As in the past, some of the 1936 drilling was in search of deeper producing horizons in the older fields, a phase of Dutch East Indies operations proven profitable in the past.

All companies interested in the islands maintained extensive geological departments. Core-drilling was practiced extensively in northern Borneo, Java and Sumatra.

Detailed geological work was carried on during 1936 by the Standard Oil Co. of California's foreign operations department with a view to drilling one or more exploratory wells in 1937 on its extensive holdings north and a little west of the Djambi and Palembang producing districts in Sumatra. The company's holdings in that territory consist of about 150,000 acres.

The B.P.M. probably will continue its exploration program in the Barito River district of Borneo and in the event commercial quantities of crude production are developed, the company plans construction of 185 miles of pipe line to its refinery at Balik Papan. The Palembang and Djambi districts in South Sumatra are the most productive in the Dutch East Indies, accounting for more than 45 per cent of the total production. During the first 10 months of 1936, it is estimated that South Sumatra produced 18,249,120 bbls., or a daily average of 60,030 bbls., which is approximately the same rate reported for 1935 of 60,010 bbls. daily. The Sanga Sanga district of eastern Borneo produces about 25 per cent of the Dutch East Indies' crude. During the first 10 months of 1936 the Sanga Sanga production rate was 31,-





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670 bbls. daily for a total of approximately 9,648,960 bbls., against a total of 12,876,000 bbls. for 1935.

North Sumatra, which includes the Atjeh and East Coast districts, produces about 12 per cent of the East Indies' current crude output while British Borneo, or Sarawak, accounts for approximately 11 per cent. Less than 7 per cent of the Dutch East Indies' 2,300 wells are capable of flowing their production, but the shallow depths at which many of the wells are bottomed and relatively higher average recovery per well make pumping operations economically sound.

Shallow oil sands in all productive parts of the Dutch East Indies range from 130 to 260 feet, and many of the wells are bottomed at depths above 350 feet. However, deeper pays are also proven in all the fields ranging down to 5,240 feet in Sarawak. Oil pays at 5,200 feet in the Djambi and Palembang districts and at 4,100 feet in the East Coast and Atjeh districts are being produced along with the shallow and intermediate zones.

DUTCH EAST INDIES AND SARAWAK

District—	Ten months 1936*	Daily av. 10 mo., 1936*	Oil producers on Nov. 1, 1936*	Production total 1935	Daily average Nov. 1, 1935	Oil producers Dec. 31, 1935
West Borneo (Sarawak)	3,860,000	12,700	455	5,052,000	12,789	441
East Borneo (Sanga Sanga)	9,648,000	31,470	713	12,876,000	31,855	688
Island of Ceram	255,000	840	39	288,000	821	39
Central Java (Sorebaja) (Rembang)	3,052,160	10,040	419	3,504,000	10,125	416
South Sumatra (Palembang) (Djambi)	18,249,120	60,030	361	21,911,000	60,010	346
North Sumatra (Atjeh) (East Coast)	4,688,288	15,422	87	7,280,000	15,533	95
Total	39,754,688	130,772	2,074	50,902,000	131,133	2,015

*Figures partly estimated.

In the island of Ceram, where operations are exclusively controlled by Shell's B.P.M. unit, the deepest production so far reduced to commercial standards is found at 240 to 1,000 feet. In the Sanga Sanga district of eastern Borneo, production is drawn entirely from sands between 210 and 2,600 feet and all Rembang-Central Java crude is produced from horizons ranging between 130 and 2,880 feet.

Despite the age of all Dutch East Indies fields, the daily average production per well is about 21 bbls. in the Ceram district, and it ranges upward to 24 bbls. in the Rembang-Central Java area; to 30 bbls. in Sarawak; to 45 bbls. in the Sanga Sanga zone of eastern Borneo; to 75 bbls. in the Palembang-Djambi territory, and to 180 bbls. in northern Sumatra's East Coast and Atjeh districts.

The rated refining capacity of nine refineries scattered at points accessible to the Dutch East Indies producing fields is about 140,000 bbls. daily, approximately in balance with production.

The largest refinery is that operated by N.K.P.M., the Standard-Vacuum subsidiary at Palembang, South Sumatra, which is supp'lied largely by the company's production department wells in the Palembang and Djambi districts. Additions to the N.K.P.M. refinery at Palembang completed in 1935 have been used through 1936. By addition of cracking facilities and expansion of the Edeleanu acid-treating installation, N.K.P.M. was able to increase the Palembang plant's capacity to 40,000 bbls., more than 10 times its original capacity when commissioned in 1926. No additional construction work has been undertaken in 1936 on the N.K.P.M. refinery, which in its present state is considered one of the most complete and modern in the Far East.

The B.P.M. company is now increasing its cracking facilities at the Pladjoe, Palembang, refinery which previously had a rated capacity of 20,000 bbls. daily. The B.P.M.'s largest plant in the Dutch East Indies is at Balik Papan, in eastern Borneo, where the company produces 100 per cent of the output from the Sanga Sanga district. The Balik Papan refinery has a capacity of 35,000 bbls. daily and is equipped with cracking facilities for processing 7,400 bbls. a day. At Pladjoe, B.P.M. is erecting two duo-coil selective full flashing cracking units under Dubbs license. Until the present construction was started, the Pladjoe refinery was qualified to process 20,000 bbls. of crude daily through its skimming equipment.

A cut into the operating profit of exporting oil companies in the Dutch East Indies was instituted late this year in an effort to adjust government income to requirements, despite devaluation of the guilder in the worldwide monetary adjustment. An export tax of 2 per cent ad valorem was posted against nearly all Dutch East Indies commodities, including petroleum, effective November 6, 1936. The 2 per cent export duty was levied to offset a reduction of 8,500,000 guilders in the government's annual import duty revenue. Revenue from imports was lowered when the guilder was devalued in line with currencies of France, England, Italy and other countries.

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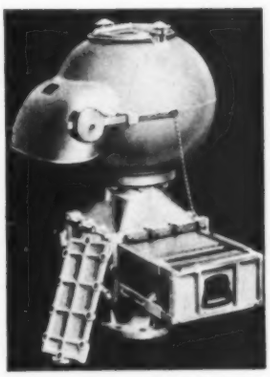

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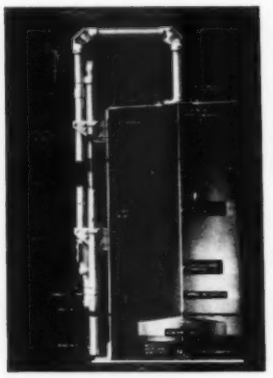

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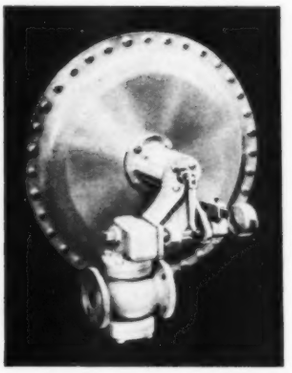

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Twin well hook-up in Quiriquire field, Venezuela

TOOLS that PERMIT Continued DRILLING THROUGH..

HEAVING SHALE

EVEN THOUGH the DRILL STEM BECOMES STUCK.....

T.I.W. Heaving Shale Drilling Assembly, Patent Pending

T.I.W. Safety Joint Patent Pending

1. T-I-W HEAVING SHALE DRILLING ASSEMBLY

When the shale formation is encountered, the shale bit illustrated herewith is run in the hole on a combination string of regular drill pipe and flush joint casing, the latter on bottom. The two types of pipe are connected by a T-I-W Safety Joint. Shale is drilled in the regular manner. In case pipe becomes stuck, and cannot be rotated or pulled, drill stem is rotated to the left, breaking out the T-I-W Safety Joint, and leaving flush joint casing in the hole. T-I-W Shale Bit may now be very easily milled through, and the procedure repeated with smaller diameter flush joint casing.

This practice, being generally used on many wells in heaving shale territory, greatly facilitates this difficult drilling. Combined with efficient drilling mud control, it offers you the most reliable practice in the safe penetration of heaving or sloughing formations. Full details on both tools, and details of experience gained in their use, will be provided on request to any interested operator.

2. T-I-W SAFETY JOINT

The T-I-W Safety Joint is as strong as any joint in the string. It is, however, designed so that it will not back off going into the hole, yet it will break out on left rotation, at one-fifth the pressure required to break out a tool joint. Thus, when it is desired to break loose this may be accomplished safely.

Ideal to run above shale drilling assemblies, all fishing tools, cutting tools, lace joints, reamers, roller bits, and core barrels.

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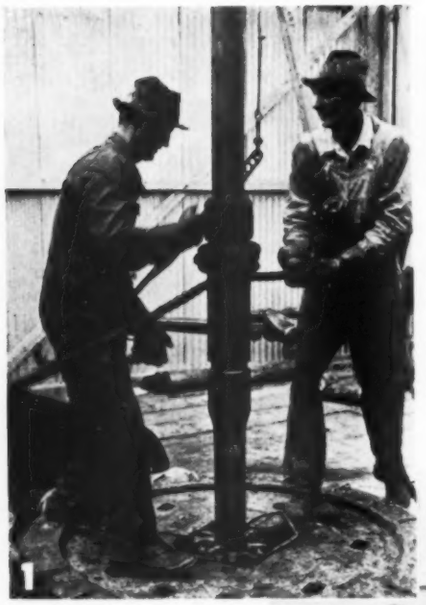

One string of Pipe drilled 4 wells at Rodessa

1. Making up drilling string at Rodessa well. Note protection to tool joint by Protector.

2. Running in external upset drill pipe.

3. Ready to make up another string.

100% PROTECTION with the RIGHT KIND of PROTECTORS

PIPE LIFE LENGTHENED with PATTERSON-BALLAGH PROTECTORS

At Rodessa, drilling contractors and crews are taking pride in the lengthened life of equipment they are obtaining. Patterson-Ballagh Pipe & Casing Protectors are used in the majority of wells, much to the satisfaction of the crews. The drilling string illustrated here has been used for four Rodessa wells. The external upset drill pipe has not lost any diameter. It's practically as good as new. The rubber Protectors are giving 100% protection.

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GREAT BRITAIN

Imports of crude oil and petroleum products into United Kingdom indicate that a new peak in consumption was established in that country which is Europe's most important market for petroleum products. These imports are shown in the following table:

PETROLEUM IMPORTS

Products—	1936*	1935
Crude oil	14,725,340	14,248,000
Gasoline	36,372,000	35,310,000
Kerosene	6,042,672	5,181,000
Gas oil	3,276,000	3,083,000
Fuel oil	19,279,200	18,773,000
Lubricating oil	3,380,000	2,782,000
Others	483,600	14,000
Total refined	68,833,872	65,995,000
Paraffin wax†	113,278,800	127,801,000
Asphalt‡	93,276	92,006

*Estimated for last two months of 1936. †Figures in pounds. ‡Figures in metric tons.

Only about 5,000,000 bbls. of refined products have been exported from the United Kingdom for this year, although upwards of 6,000,000 bbls. of fuel oil was transferred to ships' bunkers in foreign trade or fishing and should not be included in the imports for a true reflection of internal British consumption.

The United Kingdom continued to draw heavily on Iraq for its crude oil supply and during 1936 nearly 27 per cent of the imports were supplied by that country. The Netherlands West Indies supplanted Mexico in crude shipments to the United Kingdom and during 1936 furnished about 20 per cent of the total. Iran was the third largest source for English crude falling just under 20 per cent while Venezuela and Peru together furnished about 25 per cent and the remainder was scattered between British countries, Mexico and others.

The Netherlands West Indies shipped slightly less than 50 per cent of the United Kingdom's gasoline imports during the year while Iran furnished about 20 per cent. The United States accounted for more than 10 per cent of the gasoline business while Rumania was next with about 7 per cent and British West Indies followed with 6 per cent. Remainder came from other British countries, the U.S.S.R., Mexico, Netherlands West Indies and others.

Iran and Netherlands West Indies supplied nearly 60 per cent of the kerosene with Rumania in third place and others trailing with small amounts.

Nearly 50 per cent of the gas-oil imports were drawn from Rumania, but Netherlands West Indies dominated the fuel oil market supplying nearly 50 per cent of the total. Iran and Mexico each claimed about 20 per cent of the fuel oil traffic and others, considered individually, supplied negligible amounts. The lubricating oil market was held chiefly by the United States which supplied more than 60 per cent of the imports. The U.S.S.R. was the nearest rival with about 20 per cent of the business.

VENEZUELA REFINERY CAPACITY

The present capacity of refineries in Venezuela is 30,315 bbls. daily, but they are all of the skimming type and all products, except those consumed locally, are moved to the Netherland West Indies for finishing.

Existing refineries and their capacities are:

Company—	Location	Capacity per day
Caribbean Pet. Co.	San Lorenzo	17,000
Lago	La Salinas	5,000
Lago	La Arriaga	2,000
Standard of Venezuela	Caripito	4,000
Venezuela Gulf	Cabinas	1,800
Tocuyo	El Mene	250
Colon	Tarra	200
British controlled	El Mene	65
Total		30,315

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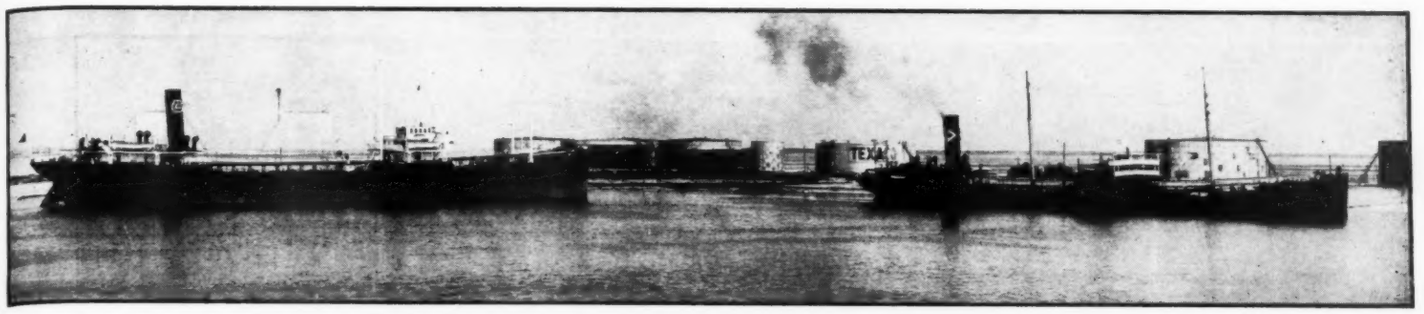

Busy harbor on the Texas Gulf Coast where petroleum products are shipped to all parts of the world

U. S. Participation in Foreign Market Increases 7 per cent

A check of petroleum exports at the close of the first nine months of 1936 shows a total value of $193,537,000, a figure exceeding the same period last year by nearly 7 per cent, though petroleum did not achieve the same improvement experienced by all exports combined, the total value of which rose 10.9 per cent in the period under review. Normal foreign consumption was generally higher and disturbed conditions resulting from actual and threatened war operated to build up abnormal stocks. On the other hand, the rising domestic demand reduced slightly the availability of crude and most refined oils for export. Increased crude production from foreign fields and the expansion of refining capacity in practically all industrialized countries tended to lower the demand abroad for American petroleum products. Seemingly the time has passed when the United States supplied the bulk of the refined oil needs of the world.

During the first three quarters of 1936, crude valued at $48,975,000 outranked all other petroleum exports, even slightly exceeding in value total shipments of lube oils. Notwithstanding a decrease of 500,000 bbls. in crude exports and an increase of nearly 4,000,000 bbls. of refined oil exports, the proportion of crude to all petroleum exported in point of value remained practically unchanged. Accountable for this was the decreasing differential between the export value per barrel of crude and refined oils—$1.30 in 1935; $1.23 in 1936. Refined oils gained at the expense of crude, however, as the ratio of refined oil to crude exports increased from 126 per cent during the first nine months of 1935 to 138 per cent in the same period of this year. This development should continue as it permits the application of American labor, materials and equipment to crude produced in this country instead of sending it abroad for processing.

INCREASED PURCHASES

Around 95 per cent of the crude exported went to Canada, Japan, France, Italy and Argentina. Increased purchases were made by all of these countries, except France, the recipient of the bulk of Iraq's mounting production. Canada alone took 19,225,000 of the total foreign shipments amounting to 37,665,000 bbls., and Italy's abnormal imports of crude during the last quarter of 1935 continued in slightly reduced volume during most of the period, January-September of this year. Heavy crude shipments continued to Japan, now second largest importer of American crude, to feed the growing throughput of that country's refineries. More American crude went to Argentina to partially displace oil from Peru, currently at odds with the former country over import duties.

Foreign shipments of gasoline at 16,945,000 bbls. represented a reduction of volume of 1,870,000 bbls. and a value decline of $1,635,000 from the first nine months of 1935. Smaller purchases by the United Kingdom occasioned two-thirds of the loss, while the drop in exports to France accounted for much of the remainder. The chief competitors of American gasoline, Netherlands West Indies, Rumania, Netherlands India and Peru all increased exports over the January-September period last year, thereby displacing business which otherwise would likely have come to refiners in the United States. Shipments to Canada, of only moderate importance as the demand there is met largely by the domestic refining of American and foreign crudes, declined from 683,000 to 382,000 bbls.

SPAIN AND RUSSIA

Neither the increased shipments to Spain—imports of American gasoline at 2,000,000 bbls. were slightly more than for the whole year of 1936—nor the occasional exports to Russia should be considered as permanent business gains. Spanish consumption is abnormally heavy due to the civil war and the Soviets will likely supplement their Far Eastern petroleum supplies at the best prices wherever expedient: Netherlands India, Bahrein or the United States. Such shipments made up the 500,000 odd barrels of American gasoline consigned to Vladivostock during the period under review.

For years the United States has led the world in the production and export of lube oils. While continuing to hold that position, the proportion of exports to production for the first nine months of 1936 fell from 30.34 to 27.75 per cent as compared with the same period last year, due more to unavailability for export on account of the heavy domestic demand than to increased competition from foreign refiners. Notwithstanding the drop in the export to production ratio, lube oil shipments increased by 187,000 bbls. and the total value of exports at $25,820,000 represented a gain of $3,418,000 over the corresponding period of 1935. Red and pale or neutral oils were up from 3,728,000 to 3,917,000 bbls. and black oils from 383,000 to 393,000 bbls. Cylinder oils and bright stocks declined slightly from 2,069,000 to 2,065,000 bbls.

Germany and the United Kingdom, respectively, increased their imports of American lube oils by 131,000 and 117,000 bbls. Shipments to Italy fell by 83,000 bbls.; to Denmark by 41,000 bbls. There was little change in the exports to eight other leading countries, which together with the four just mentioned take approximately 80 per cent of all American lube oils shipped abroad.

Indicative of the growing use of the diesel engine and the expansion of cracking capacity abroad are the rising exports of gas oil and distillate fuel oil. Exports of 13,603,000 bbls. for the first three quarters of 1936 exceeded the same period last year by 3,226,000 bbls. and an 8-cent rise per barrel brought the total value to $17,645,000. Fuel oil also experienced a marked rise in export demand—from 7,749,000 to 9,362,000 bbls. At the same time exports increased in value from $6,543,000 to $8,188,000. During the period under review close to 28 per cent of total gas and fuel exports, 26,440,000 bbls. in all, went to Japan, although shipments to that country were actually 570,000 bbls. under the first nine months of 1935. At the same time Germany increased imports of American gas oils from 487,000 to 1,433,000 bbls.; the Netherlands from 485,000 to 1,084,000 bbls. Notable increases in fuel oil exports were recorded for Italy, 80,000 to 850,000 bbls.; Spain, from nothing to 700,000 bbls., and Canada, from 595,000 to 959,000 bbls. Imports into Chile, frequently the next largest buyer of American fuel oils to Japan, remained practically stationary at 865,000 bbls. as compared with the same period last year.

As would be expected in view of the pickup in foreign trade, bunker oils were in greater demand. The improvement, however, was due almost entirely to the heavier requirements of foreign vessels, which rose from 9,750,000 to 13,338,000 bbls.; bunker purchases for American ships remained practically stationary at 13,102,000 bbls.

KEROSENE SHIPMENTS

Foreign shipments of kerosene continued to diminish through the first nine months of this year, falling 420,000 bbls. as compared with the same period in 1935. Nor was the increase of 11 cents per barrel in export value sufficient to keep the total value of kerosene shipments from declining by close to $1,500,000. Although a falling off in exports is noticeable to most countries, in a few instances considerable increases occurred. Finland's imports of American kerosene rose from nothing to 110,000 bbls.; Sweden's increased by 82,000; the Philippines' by 90,000, the United Kingdom's by 70,000 and Netherlands West Indies, the largest purchaser of American kerosene, by 68,000 bbls. Consumption of kerosene in the Orient, formerly the most important outlet for American kerosene, had diminished somewhat. Moreover, in recent years demand has been met increasingly from Netherlands India and Iran, sources more accessible than the United States.

Total imports of petroleum and products during the first nine months of 1936 were only slightly higher than for the corresponding period of last year. The combined volume of incoming shipments of crude and advanced and refined oils amounted to 42,220,000 bbls., an increase of 185,000 bbls., and the aggregate value of imports edged up $158,000 to $28,535,000. As in past years, Vene-

M.
I.
W.

M.
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M. I. W. PITMANS

Special features of the M. I. W. Pitman are: toggle joint that is self-locking when closed and a compression spring that holds it open when open.

The stirrup connection to the beam is made through two car channels that are securely welded to the 8-inch wide flange beam, making the bolts work in double shear. Additional holes permit adjustment in length.

The bronze wrist pin bearings are completely enclosed in an oil retaining case which remains on the pin when the toggle is open and the pitman removed.

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zuela supplies the bulk of the crude, Netherlands West Indies most of the fuel oil and gas oil, and Mexico, though much less important, contributed substantial quantities of crude, fuel oil and unfinished distillates. From Canada came some 200,000 bbls. of fuel oil: from Colombia about 70,000 bbls. of crude petroleum.

A segregation, however, of the items comprising the import group of petroleum and products reveals material changes if compared with the first nine months of 1935. Crude, entered into bond for refining and export, slumped from 5,930,000 to 1,380,000 bbls. accompanied by a value decline from 79.6 cents to 70.5 cents per barrel. Crude for domestic consumption, subject to an excise tax of 21 cents per barrel, advanced to 22,225,000 bbls., an increase of 3,750,000 over the corresponding period of 1935 and experienced a rise in value from $13,145,000 to $15,607,000.

Incoming shipments of fuel oil entered into bond for supplies to vessels at 51.5 cents per barrel, slightly lower than last year, increased from 10,015,000 to 12,830,000 bbls. On the other hand, a jump in value from 66.5 cents to 80.2 cents per barrel brought a sharp reduction of fuel oil brought in for domestic use. Imports on which there is levied an excise tax of 21 cents per barrel fell from 7,475,000 to 4,730,000 bbls.

Incoming shipments of unfinished distillates and liquid derivatives of petroleum, a miscellaneous group including road oils and asphaltic cutback, rocketed from 120,000 to 1,101,000 bbls. during the period under review. The average declared value of these products during January-September, 1936, dropped from $2.32 to $1.26 per barrel. Some 785,000 bbls. were entered into bond for re-export: the remainder paid a tax of 21 cents per barrel.

Note: Figures are based on preliminary data carried in Monthly Statistical export and import statements. Final corrected figures for 1935 are available from the Bureau of Foreign and Domestic Commerce.

Czechoslovakian Oil Cartel to Be Extended Five Years

The mineral oil cartel in Czechoslovakia, due to expire at the end of this month after five years of operation, is expected to be extended for another five years. It controls production and prices of mineral oils through a central sales office. Twelve refineries are controlled by the cartel, of which the 10 in operation have an aggregate capacity of producing about 15,000 bbls. of refined products daily.

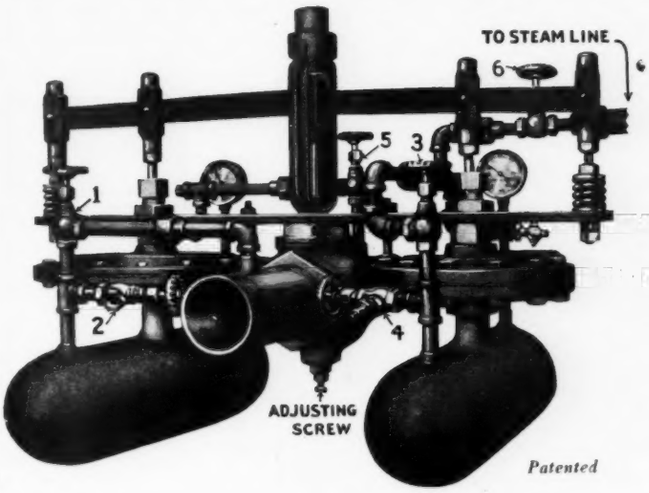
With the nation's domestic production of crude oil almost negligible, main requirements are covered by imports, of which 22.5 per cent came from the United States in 1935: 31.9 per cent in 1934: 8.4 per cent in 1933 and 5.1 per cent in 1932, according to United States government figures. Meanwhile, Soviet Russia's share of the nation's business has dropped from 39 per cent in 1932 to virtually nil in 1935. Poland has furnished an average of about 20 per cent of Czechoslovakia's supply in the last four years. Rumania's share has increased from 33 per cent to 57 per cent in that period.

According to information from American government representatives, the cartel prices are subject to price developments on foreign markets. The cartel, besides maintaining domestic prices at fixed levels which prevent extreme fluctuations, also controls imports and establishes production quotas for member refineries.

Brazil Oil Search Fails

The efforts of the Brazilian government and private interests to locate commercial oil deposits in Brazil have been entirely fruitless, according to the Commerce Department from Rio de Janeiro. During the last 15 years the government has drilled 50 wells in the southern states, 12 in the coastal belt, and 12 in the lower Amazon Valley. A number are said to have given unimportant shows while several produced small quantities of gas. Commercially all were failures.

BADGETT STEAM LUBRICATORS *and* AUTOMATIC GAS REGULATORS



Patented

Automatic Gas Regulator

The Badgett Gas Fire Control is the outstanding fire regulating equipment, guaranteed to be the best money can buy, simple to install, more than simple to operate, inexpensive to maintain, saves time and trouble, and will quickly pay for itself with the savings on fuel and expensive pop-off valves.

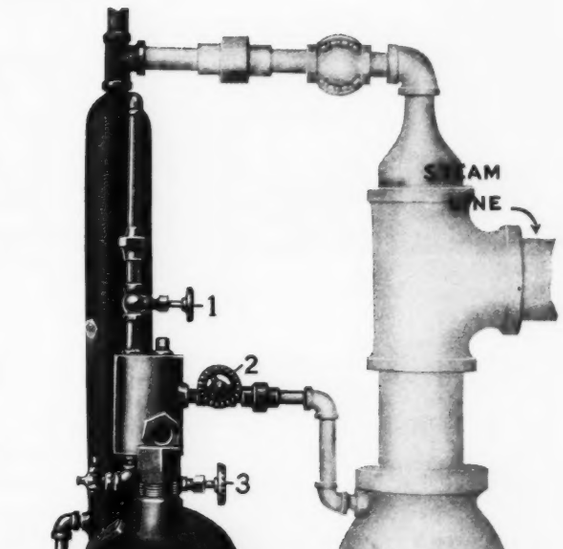
Positive Control. Guaranteed to work accurately even though the gas pressure varies as much as 50 pounds. Easily changed for any burner pressure.

7 Reasons Why

you should use Badgett Steam-Line and Engine Lubricators

1. Costs so little . . . perfect lubrication . . . no moving parts.
2. Self Heating . . . Self Cleaning.
3. Positive feed.
4. Automatic . . . amount of oil governed by speed of engine.
5. Pays for itself . . . with savings on oil, valve packing, shut-down time.
6. Convenience . . . takes less than 15 minutes each 12 hours to refill and care for lubricator.
7. There is nothing to get out of order . . . this makes Badgett Lubrication perfect.

Export and domestic orders handled through your supply house.



Badgett Steam Line Lubricator (Patented)

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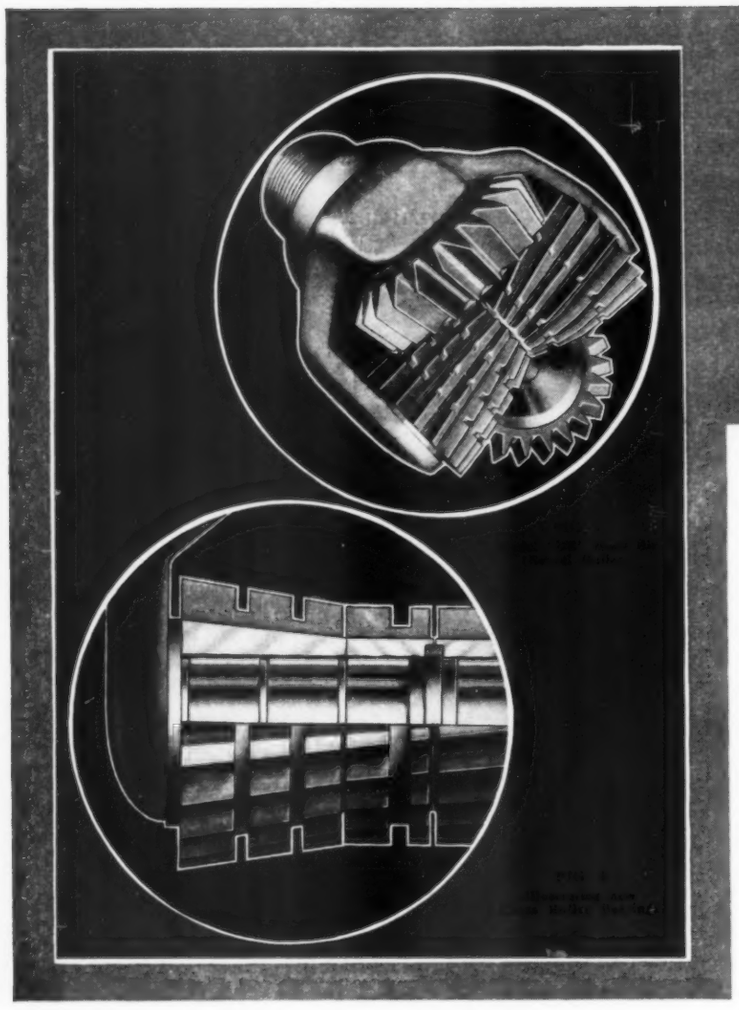


A ROCK B
NEW BE

INCORPORATING the best features of both the cross roller and the cone type rock bits, the H. C. Smith Rock Bit has been built upon sound construction principles and for the practical purpose of lowering the footage cost of hole dug.

The best scientific knowledge accumulated over the history of rock bit usage has been correlated, with the result that the design of the bit, the steels that enter into its make-up, the treatment of those steels, and the methods of operation recommended for the H. C. Smith Rock Bit truly represent a high co-efficient of performance capability.

The H. C. Smith Rock Bit is a heavy shanked, single unit, thick pronged bit but with unusually great clearance for circulation. It is vented for free and full circulation at high pump speeds. Rugged construction marks the entire assembly and a failure-proof locking device prevents any possibility of cutters being lost in the hole.

Ease of assembly is a cardinal principle of the H. C. Smith Rock Bit. Gauge cutters are unit assemblies screwed onto shank pins of the bit and positively locked in position. Cross roller assembly is mounted upon an extra heavy special alloy cross pin, which is welded into and made a part of the bit. For cutter change it is only necessary to drill out cross pin ends, slip out pin and cross cutters and unscrew gauge cutters.

Cutter teeth are designed for the particular type of formation encountered, and are supplied according to

CORE BITS

The H. C. Smith Core Barrel is the old Alco Barrel with a number of new and improved features. Specifically this barrel features a recently patented positive core catcher and a floating inner barrel. The catcher is not attached to barrel but is seated low in the core bit head, independent of the barrel. Teeth are of the pawl type inset flush with core catcher body, but sprung outwardly with leaf type springs, providing a positive core pick-up. The floating inner barrel is provided with either a drop or cage type valve, and barrel does not rotate with the core bit head. It also is provided with free circulation which lubricates core — without washing — and keeps core catcher clear and clean. Core bit heads are machined from solid steel and are heavily inset with hard surfacing metals. The smooth, easy cutting action of the bit itself insures a full, unbroken and unburned core, easily taken and easily removed from the barrel.

"X" Type DRAG BITS

The H. C. Smith X Type Drag Bit, is a special alloy steel casting, both inset and faced with diamond hard metal. The serrated blades of this bit are thinner than the regular type drag bit, but are exceedingly tough and sturdy. In some formations the X type bit penetrates faster and operates with less torque upon the drill pipe than does the regular four way bit. These bits are especially built to maintain gauge as long as there is any penetration of formation, and full and free circulation prevents balling up of the bit and increased speed of penetration.

H. C. SMITH
COMPTON,

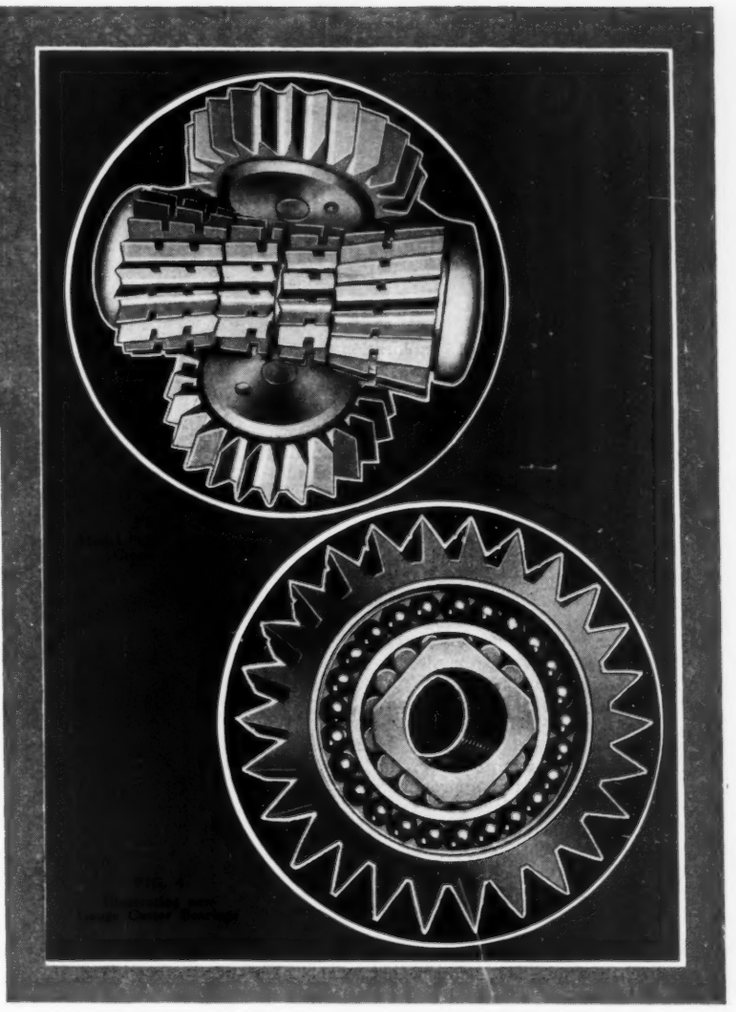
requirements. The cross assembly is supplied with either two (Fig. 1) or four (Fig. 2) cross cutters. The teeth on these cutters are either single taper edged (Fig. 2) or double taper barrel type (Fig. 1), and range from a sharp deep tooth to a heavy wedge-shaped tooth. The gauge cutters are also varied as to the number and kind of teeth, and are both straight and serrated on cutting edges. All teeth are heavily faced and inset with tungsten carbide, for lengthy service, and to retain full hole gauge. Types of formation in which cutters are to be used should be specified.

The inherent principle upon which these bits are constructed makes for the usage of unusually large husky cutters in every size, resulting in increased footage. Such cutters, in turn, make possible a wide variation in size, type and depth of cutter teeth.

The outstanding features of the H. C. Smith Rock Bit are the patented bearing assemblies. On the gauge cutters, this assembly consists of a ball bearing thrust on both sides of the cutter, as well as a heavy duty roller bearing assembly upon which the cutter rotates (Fig. 4). This innovation in bearing assemblies for rock bits performs a double function in that it, first of all, reduces to a positive minimum all friction upon the cutter, thus insuring a free rolling action and, secondly, provides positive hole gauge through the elimination of any possible "play" or "slop" in the cutters, or the possibility of crowding gauge cutters inwardly. The cross cutters are mounted upon roller bearings rotating directly upon the husky special alloy steel cross pin and thrusting directly against heavy hard-faced space rings and end washers (Fig. 3).

OIL TOOL CO.

CALIF.



4 PRONG TYPE DRAG BITS

The H. C. Smith 4 Prong Type Drag Bit is equipped with four husky staggered tooth blades set at an angle of 90 degrees, also heavily inset and faced with tungsten, and washed by a full circulation flow directly at the cutting edges of the bit. It is a heavy, special alloy steel casting, with an accurately machined box connection. The Smith Drag Type Bits are known for their long wear and speed of formation penetration.

BULL'S EYE DIGGING BIT AND HOLE STRAIGHTENER

This new development in digging bits, not only serves all purposes of the ordinary three way bit, but also has proven its value in the maintenance of straight hole, particularly in the penetration of inclined formation.

The extremely high angle on the ends and the rake of the blades prevent the possibility of slippage on dipping formations, while the pilot fishtail set back in recess angles of the three blades tends to prevent whipping.

These advantages, together with the long proven theory of three point contact being the best for straight hole drilling, makes this bit a vastly superior tool when drilling in broken or sharply dipping formations or where hole has deviated from vertical.

Both blades and pilot fishtail are of unusually heavy construction and are inset and faced with tungsten carbide metal for long cutting life.

Colombia and Peru Expanding Oil and Refinery Operations

Continued exploration on the Barco Concession under the new joint control of Texas Corp. and Socony-Vacuum Oil Co., Inc., and greater production from proven fields in Colombia and Peru, where Imperial Oil Co., Ltd., subsidiaries are dominant, marked 1936 developments in those two South American countries.

Although without benefit of important new discoveries, crude oil production during the first 10 months of the year indicated 1936 yield will be substantially above the previous year's output. Colombia's production for the current year averaged 51,897 bbls. daily during the first 10 months and if the rate is maintained through December 31, total for the year will be barely short of 19,000,000 bbls. The increase has been approximately 5 per cent through 10 months, or from a daily average of 49,375 bbls. through October, 1935, to the 1936 rate of 51,897 bbls. per day.

On a basis of 47,861 bbls. daily during the first 10 months of 1936, Peruvian production for the year probably will total approximately 17,469,265 bbls. International Petroleum Co., Ltd. (Canada), 99 per cent of which is owned by Imperial Oil Co., Ltd., Canadian subsidiary of Standard Oil Co. (New Jersey), boosted its production for the first 10 months of 1936 to 12,555,816 bbls., compared to 12,387,445 for the same period last year. Lobitos Oilfields, Ltd., subsidiary of Royal Dutch-Shell operating in Peru, produced 1,993,994 bbls. during the first 10 months of 1936, against 1,830,552 bbls. in 1935. Combined production by International and Lobitos for the first 10 months of 1936 is 14,549,810 bbls. compared to 14,217,997 bbls., or a daily average of 46,769 bbls., in the same period in 1935.

COLOMBIA

Although parts of the extensive Barco Concession, in eastern Colombia bordering on western Venezuela and southwest of Lake Maracaibo, have been proven productive, no transportation facilities have been provided for moving the oil to shipping ports. Therefore, practically 100 per cent of Colombian production for the year has been withdrawn from Tropical Oil Co. De Mares Concession, in the Magdalena River Valley and separated from the Barco Concession by a mountain range. The two fields on the De Mares Concession, Infantas and La Cira, were virtually unchanged in their relative producing ability during 1936.

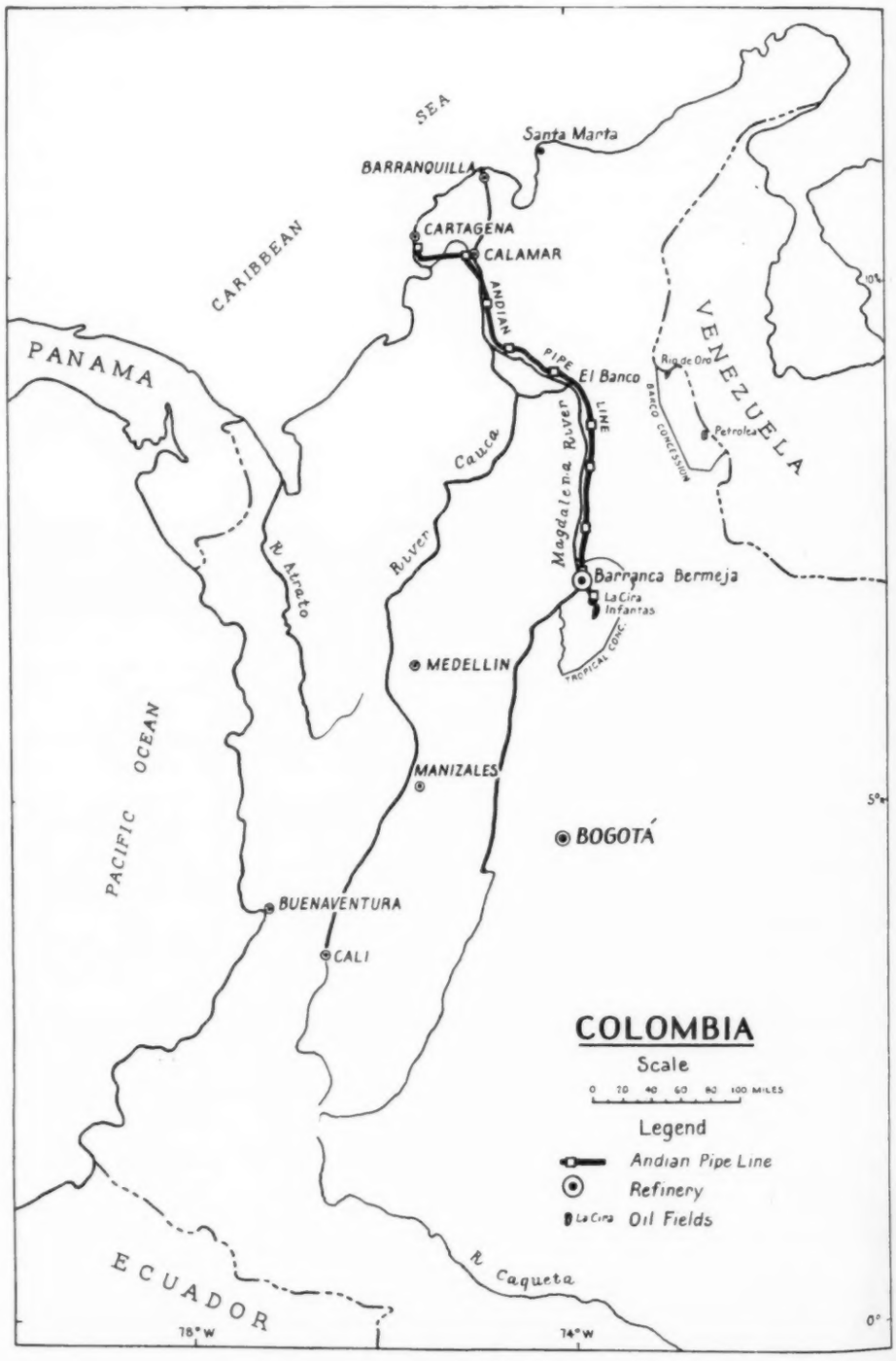
Through October, the accumulative production from Colombia is 182,644,329 bbls. Production in the Infantas field, which is 18 years old, originates from horizons at 1,000 and 2,600 feet and is Oligocene and Eocene in age. As in 1935, little new drilling was undertaken in the Infantas field, which had 452 producing wells at the start of 1936. New drilling was virtually confined to La Cira portion of the De Mares Concession. Wells in the field are bottomed at depths ranging from 600 to 3,650 feet and production averages 24.5 gravity.

Control of the Barco Concession, owned by Colombian Petroleum Co., passed from Gulf Oil Corp. to Texas Corp. and Socony-Vacuum Oil Co., Inc., in April, 1936. The new joint owners purchased 79 per cent of the stock in Colombian Petroleum Co. from Gulf for $12,500,000. Negotiations are pending for sale of the Carib Syndicate interest in the Barco Concession to a French group of oil men for $2,000,000. Carib Syndicate obtained the concession from heirs of Barco and originally sold a 75 per cent interest to Cities Service. About 10 years ago Texas Corp. obtained an option on Cities Service's interest but did not exercise it at the time.

To the end of November there had been a total of 10 wells proved productive on the north Petrolea dome in Santander del Norte, Colombia. The wells proved productive on the North Petrolea dome range in depth from 600 to 1,300 feet and find production in the Lower Cretaceous. Oil ranges from 40° to 48° A.P.I. gravity and has valuable refining qualities.

Exploration continues on the Rio de Oro anticline, but so far no production has been developed.

Drilling operations probably will be started in



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GALVANIZED RIVETED STEEL TANKS

Built Especially for Storing Sour Crude and Gasoline in Refineries

Columbian Steel Tank Company has been a leader in the development of tanks for fabrication of refinery units for the oil industry.

This leadership has resulted in the application of Columbian Cop-Nic Galvanized COP-NIC steel to the manufacture of galvanized riveted Cop-Nic Tanks, which are especially adapted for storing sour crude and gasoline or corrosive products of refineries.

Cop-Nic Tanks have been found to withstand the corrosive action of sour crudes from which the sulphur compounds are not removed before storage. Cop-Nic Tanks are also recommended for storing gasoline containing tetraethyl lead or other anti-knock compounds.

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MAIL THIS COUPON

1937 by Socony-Vacuum Oil Co., Inc., on the Sr. Luciano Restrepo Concession adjacent to Tropical Oil Co. De Mares Concession and north of the Sogamosa River. Socony-Vacuum obtained the concession in 1934 and has engaged geologists and geophysicists on the property continuously since that time. Terms of the lease require drilling operations to start in 1937.

Wildcat exploration in the Barco Concession which includes approximately 1,500 square miles probably will be launched by the middle of next year with a view to proving or disproving some of the geological features mapped or projected since it was acquired. Development so far has been confined to progressive extension of drilling from one location to another on the La Petrolea structure in the southern part of the concession.

La Petroleo district oil is obtained from Lower Cretaceous at depths ranging from 500 to 1,300 feet. La Petrolea district is underlain by schist obtained at approximately 2,200 feet, but dependent on structural position to some extent.

There have been 3 failures drilled on La Petrolea portion of the Barco and one earlier producer has been abandoned. There was one drilling test under way at the end of November.

The most difficult problem now engaging operators is the matter of moving equipment to and within the drilling zones. All materials are landed in Colombia via ocean vessels to Venezuela and by barges through Lake Maracaibo and by rivers which head up in eastern Colombia and flow toward the Maracaibo basin.

Typical light-duty rotary rigs are engaged in drilling the shallow La Petrolea locations. However, the heavy-duty type of equipment is being used in the Rio de Oro district on the northern end of the Barco Concession where depths of more than 6,000 feet are required to reach the equivalent producing beds in La Petrolea area.

One original producer on the Rio de Oro structure drilled by Cities Service several years ago has been abandoned since.

Texas Corp. and Socony-Vacuum Oil Co. abandoned No. 2 Oro, which was under way when the present operators acquired control from Gulf. The failure was carried to below 6,370 feet after slight showings of oil and gas were encountered at 6,318 feet in the lower Cretaceous. No. 3 Oro is now drilling. It is three quarters of a mile south of No. 2 Oro abandoned hole.

Fulfilling terms of the Concesson, Texas Corp. and Socony-Vacuum made the original selection of 100,000 acres during the middle of 1936. All of the acreage selected was in La Petrolea district covering several structural features. The operators have until 1941 to select approximately 400,000 additional acres for a total of 500,000 acres out of the 1,500 square mile Concession. Although terms of the Concession require construction of a pipe line to a Colombian deep water port when potential production reaches 20,000 bbls. of oil per day, it is highly improbable any decision on this project will be reached until considerable more area is explored and until production results justify this expenditure. It is estimated the pipe line to the northern shoreline of Colombia, the only part of the country affording deep water shipping facilities, will cost in the neighborhood of $6,000,000. It would be necessary to penetrate dense jungle, cross a mountain range with average altitude of 4,000 feet and lay 250 miles of line with ample station capacity to pump crude over the required altitudes.

PERU

As in the past, the International Petroleum Co., Ltd.'s LaBrea-Parinas estate supplied the large bulk of production from Peru. On basis of production during the first 10 months of 1936, averaging 41,302 bbls. daily, LaBrea-Parinas field will set another all-time record projected to 15,075,230 bbls. for the year, against a previous peak of 14,756,914 bbls., produced in 1935. Production through October, 1936, from LaBrea-Parinas estate totals 161,097,339 bbls. The field was discovered in 1890. Success continues to attend deepening operations and acidizing of partly depleted horizons. Reintroduction of approximately 60 per cent of the natural gas produced with the oil and employment of modern production practices have arrested declining output and sustained several of the older wells which were nearing abandonment stage.

The only other production worthy of review in Peru is from Lobitos Oilfields, Ltd.'s property north of the La Brea-Parinas estate, which averages approximately 6,500 bbls. per day. During the first 10 months of 1936, Lobitos produced 1,993,994 bbls., or a daily average of 6,559 bbls. If the rate for 10 months of 1936 is continued, the Lobitos output for 1936 will total about 2,394,093 bbls. and will raise the accumulative output to 38,598,271 bbls.

There are two pools in the Lobitos property, one at Lobitos and the other designated as the Cabo Blancho field. Both pools produce from the Eocene and Oligocene.

Accumulated production from Peru at the end of 1936 will be approximately 199,695,610 bbls., including roughly 50,000 bbls. for the year from Piaggio & Co.'s property at Zorritos and 285,936 bbls. recovered from 1906 to 1915 from the Pirin anticline where the government controls approximately 120,000 hectares of reserved land. The area is not contributing to current production.

Government exploration was started in 1936 in the coastal zone of the Province of Tumbes with a test well about 10 miles from the Port of Zorritos in the Quebrada Zapotal. Results of this work have not been reported at this time.

Tropical Oil Co. (International) started operation in 1936 of its new phenol treating plant for solvent refining of lubricating stock and its new crude distillation unit was placed on stream raising capacity of its refinery at Barranca, Colombia, to 9,000 bbls. daily.

International Petroleum Co., Ltd. (Canada), has a large refinery at Talara, Peru, capable of processing 16,000 bbls. of crude per day. The plant also has cracking capacity of 6,800 bbls. Canada, France and Netherland West Indies absorb the bulk of crude production in Colombia in excess of the country's refining capacity.

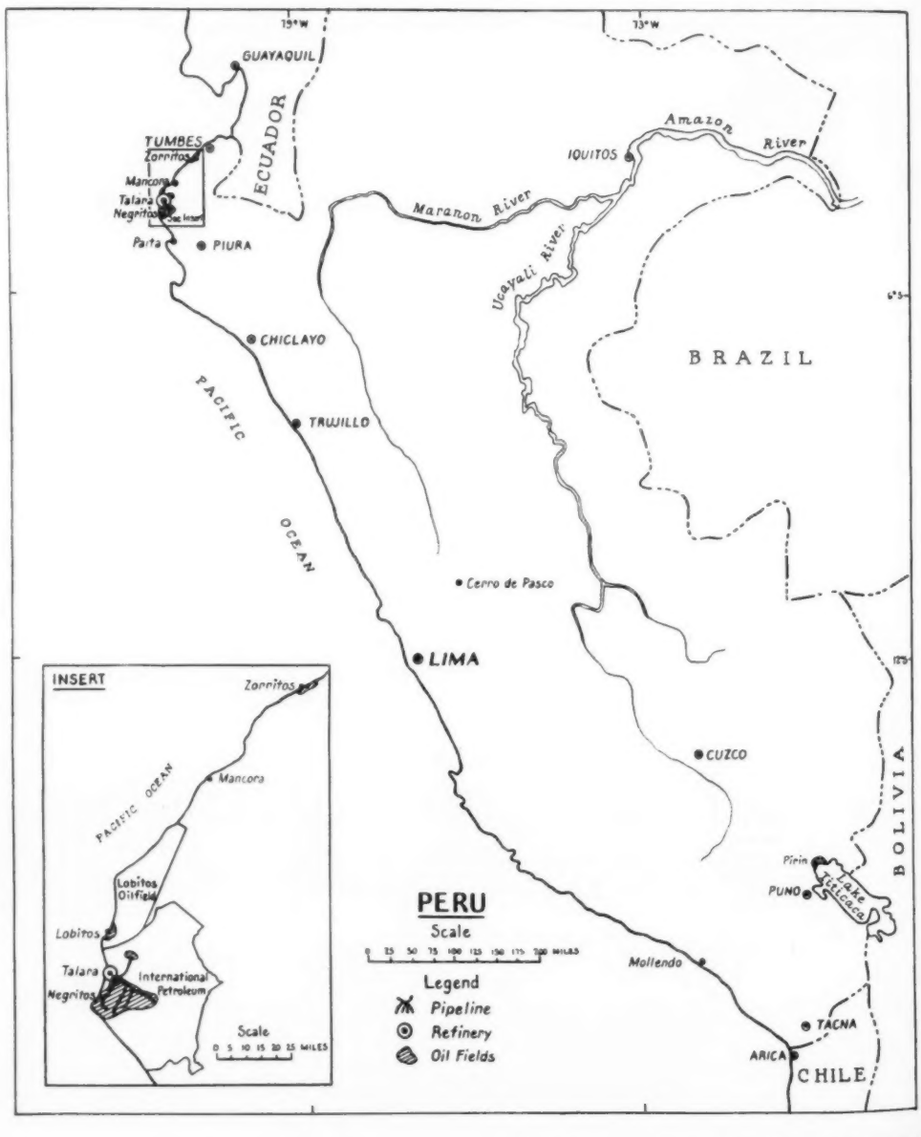
Peru exports a large range of products to an extensive list of European, South American and North American countries in addition to sending its crude surplus to the Netherlands West Indies and to Canada.

COLOMBIA AND PERU PRODUCTION

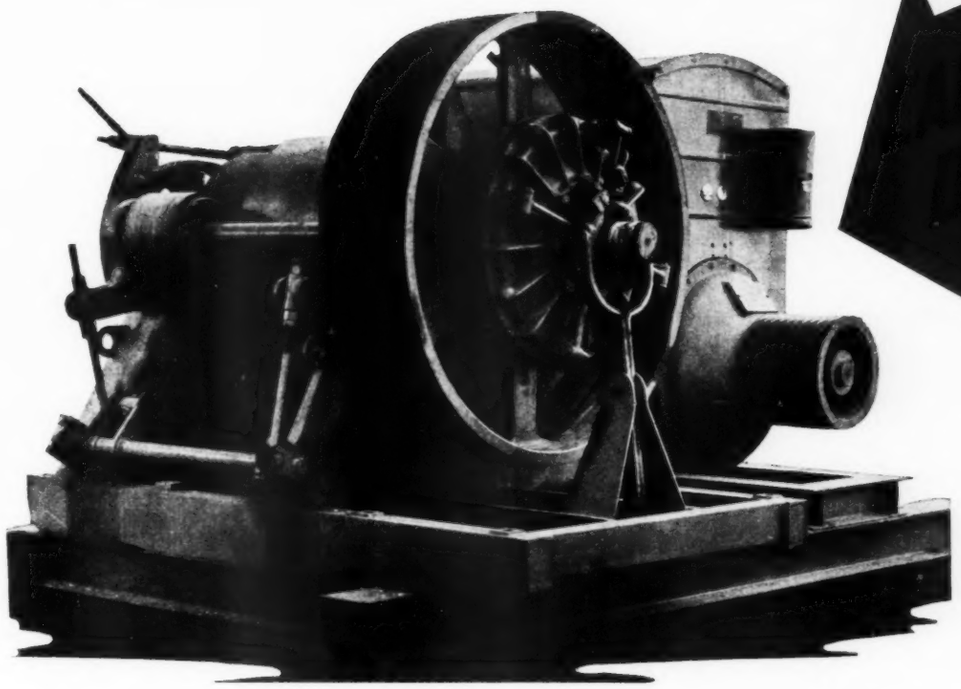
(Data in barrels)

	Colombia		Peru	
	1936	1935	1936	1935
January	1,611,618	1,653,647	1,193,714	1,248,465
February	1,475,403	1,141,696	1,126,810	1,105,508
March	1,619,620	1,446,821	1,169,859	1,218,852
April	1,427,193	1,377,299	1,218,098	1,160,942
May	1,598,544	1,486,896	1,308,650	1,281,189
June	1,529,901	1,518,460	1,262,543	1,240,281
July	1,585,345	1,639,054	1,325,419	1,276,305
August	1,553,606	1,567,307	1,336,084	1,272,038
September	1,575,273	1,555,676	1,293,087	1,275,919
October	1,600,288	1,623,372	1,322,052	1,307,946
Total 10 Months	15,576,791	15,010,228	*12,555,816	*12,387,445
Daily Average	51,897	49,375	*41,302	*40,748
Years total		17,597,654		*14,756,914
Lobitos Oilfields 10 month's Production			1,993,994	1,830,552
Grand Total 10 mos.	15,576,791	15,010,228	14,549,810	14,217,997
Total Daily Average	51,897	49,375	47,861	46,769

*Includes only International Petroleum Co., Ltd.'s figures.



BRIDGEPORT



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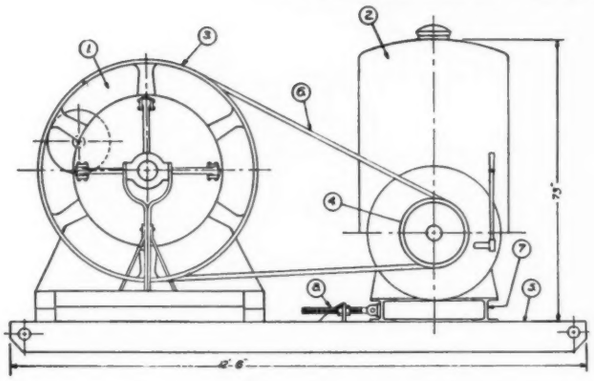

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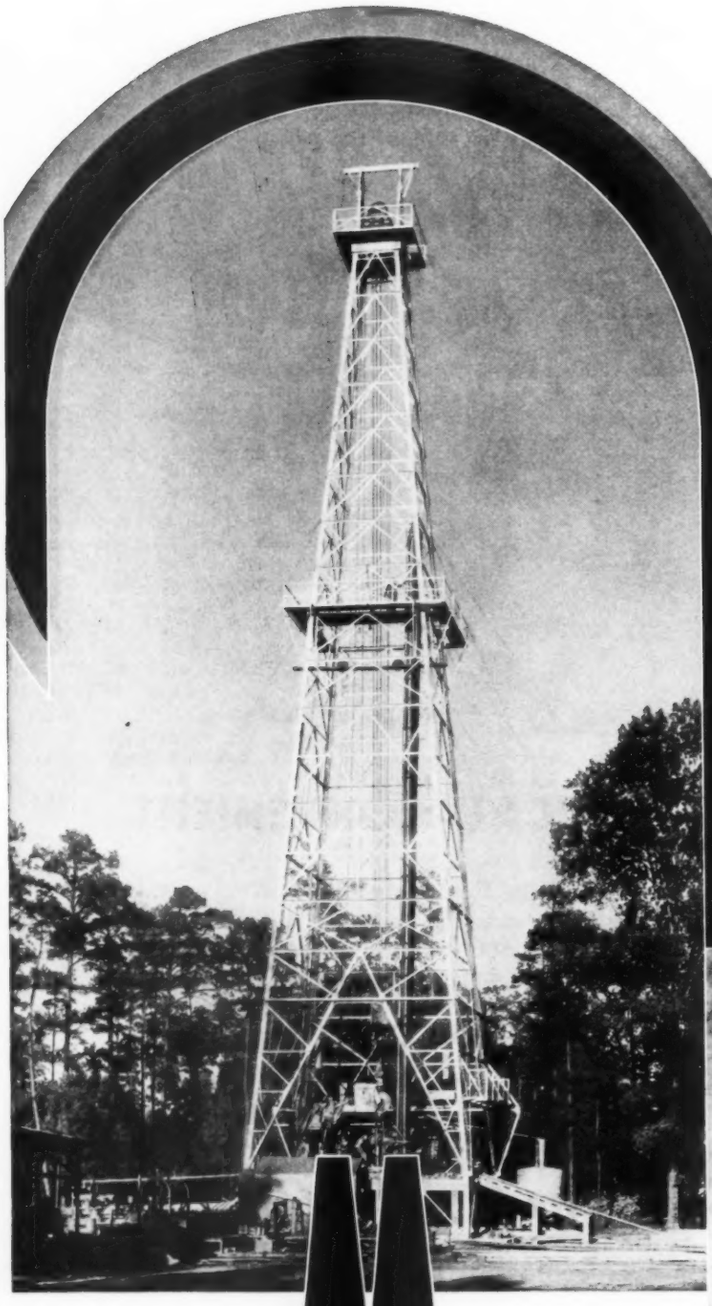
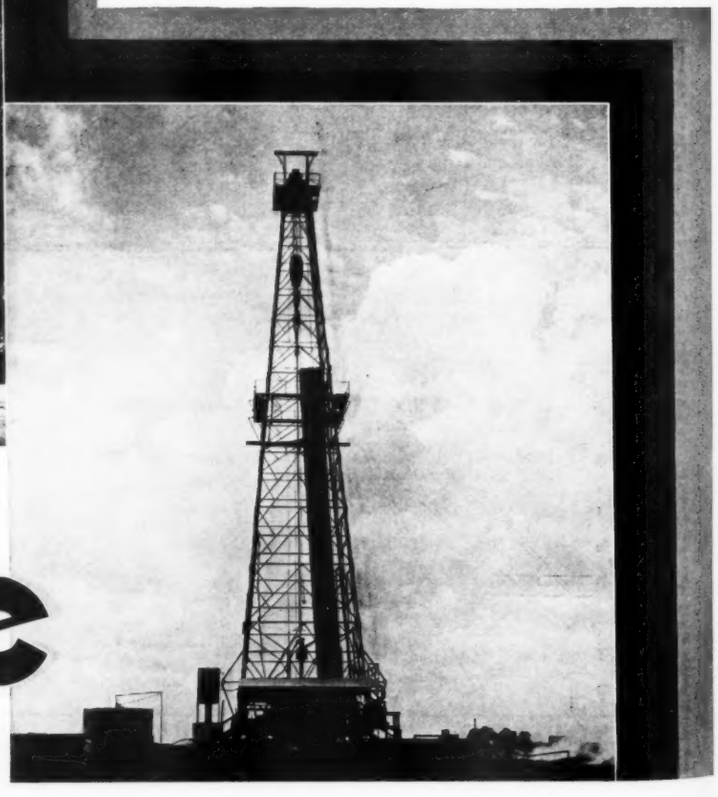
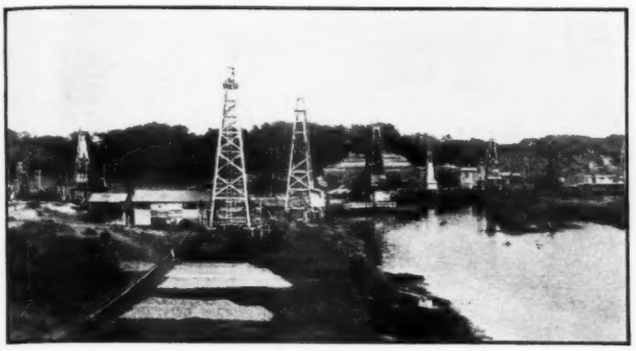




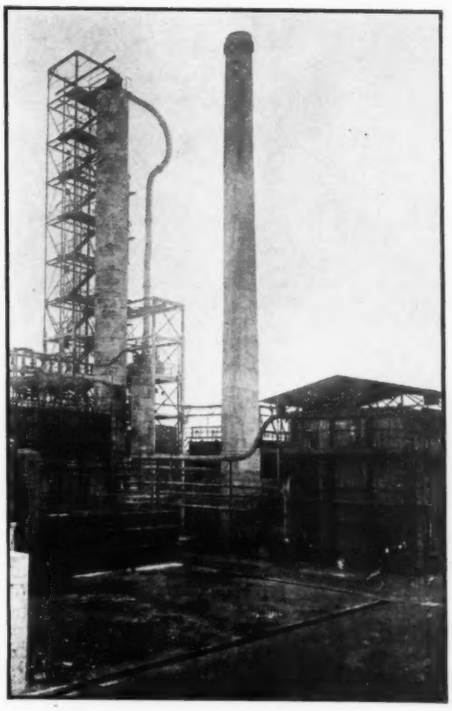
The rugged reliability of Moore derricks has been proved at the deep test well at Abbeville, Vermilion Parish, Louisiana (right) and the deep test well in Webster Parish, Louisiana (left). The derricks shown are 136' high with 30' base and have 800,000# safe working capacity.

DERRICKS PUMPING EQUIPMENT Moore

Japan Encourages Oil Exploration



Oil field in Yabase district



Pipe still, Tsurumi, near Yokohama

The home yield of crude oil in Japan until about 1916 was approximately 2,600,000 koku a year (1 koku = 47.654 Am. gallons), and covered the domestic demand to the extent of about 70 per cent. In subsequent years home production of crude oil has declined, and imports of both crude oil and petroleum products have been steadily increasing. Domestic output dwindled to 1,283,000 koku in 1933, after a short recuperation in 1930. A fresh upswing followed, but last year's output fell short of 1916 by about 25 per cent.

Last year 62 per cent of the total petroleum supply came from abroad, and, if imported[1] crude oils are included, 92 per cent of the total local demand was dependent on foreign supply against 8 per cent produced at home.

These figures account for civil consumption only, while purchases by the Imperial Navy are estimated at 233,000,000 gallons.

With a view to encouraging domestic drilling operations, the new oil business law was enforced by the Japanese government. This law is designed to prevent flurries in the market and to assure a steady supply by giving each company in the field a quota. These are announced each quarter and are based on the following estimates:

OIL SALES QUOTAS FOR 1936

(In Kilolitres)*

Gasoline:		
1935 Consumption	1,105,000	
Estimated Natural Increase, 1936..	140,000	
		1,245,000
Sales Quota, Refineries	660,700	
Importers	584,300	
		1,245,000
Kerosene:		
Estimated Consumption, 1936		130,000
Sales Quota, Refineries	77,700	
Sales Quota, Importers	52,300	
		130,000
Light Oil:		
Estimated Consumption, 1936		160,000
Sales Quota, Refiners	160,000	
Sales Quota, Importers		
		160,000
Machine Oil:		
1935 Consumption	244,000	
Estimated Natural Incease, 1936	26,000	
		270,0000
Sales Quota, Refiners	241,000	
Sales Quota, Importers	29,000	
		270,000
Crude Oil:		
1935 consumption	1,246,000	
Estimated Natural Increase, 1936..	210,000	
Refineries' Own Consumption	4,000	
		1,460,000
Sales Quota, Refineries	303,200	
Sales Quota, Importers	1,152,000	
Import by Refiners for Self. Con...	4,000	
		1,460,000

*Kilolitre = 264.17 U. S. gallons or 6.5 bbls.

Last year 8,293,000 bales of petroleum products were refined from domestic crude oil, an increase of 32 per cent over the previous year. Last year's figure for "home produced oil," a standard term which includes both domestic and foreign crude oil refined in the country, reached the all time peak of 37,777,000 bales, a gain in refining capacity of more than 4 million bales compared with the previous year.

The growing activity on the part of local prospectors and refiners is due to various circumstances.

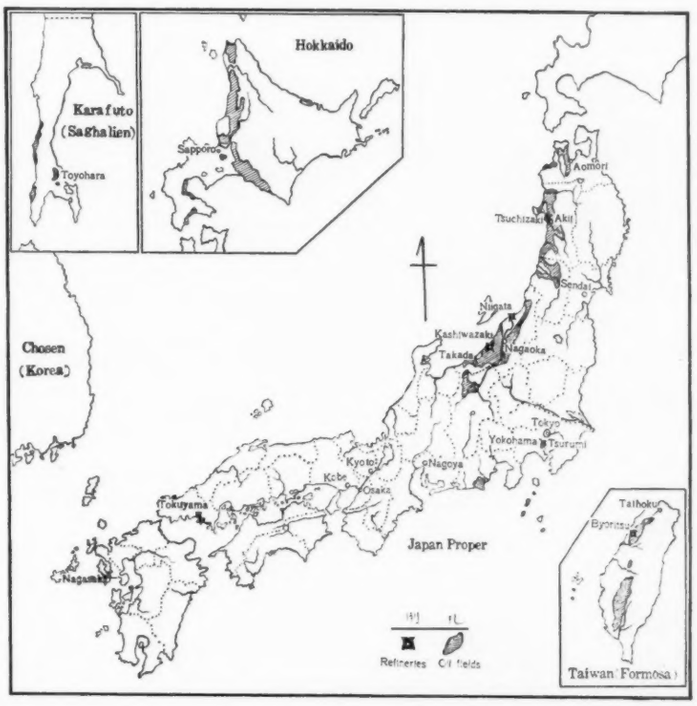
As far as oil draining is concerned, it should be noted that there has been considerable underproduction during the period immediately preceding the present boom years. Japan has 1,347 petroleum districts out of which only 459 are under actual operation. The aggregate area of oil fields embraces 735,000,000 tsubo (1 tsubo = 6 square feet), but only 125,865,000 tsubo, a little more than one-sixth, are being prospected. Lack of capital, poor drilling technique, high drilling cost, and cheap oil imports were factors which did not encourage local prospecting activity.

The Japanese government has been increasing appropriations for the encouragement of prospecting and drilling operations in Japan, the subsidies totaling this year 280,000 yen for prospecting and 56,000 yen for geological investigations.

Besides, a special fund of 102,000 yen has been put aside for the encouragement of prospecting in the famine-stricken Tohoku area. The Governor-General of Formosa has appropriated 885,000 yen for drilling operations in the area under his jurisdiction.

Aggregating 1,323,500 yen, the subsidy granted by the Japanese government cannot favorably compare with the sums appropriated for this purpose in other countries.

However, a considerable increase is expected for the next fiscal year. Well informed quarters understand that the subsidy for prospecting purposes in Japan proper will be increased to 600,000 yen and that the total appropriation for the encouragement of liquid fuel production will be advanced from 4,460,000 yen to 10,800,000 yen.



Though under the new oil business law all oil operations in Japan are subject to government license the advocacy in government circles of a preferential license system such as enforced last July for the promotion of the domestic automobile industry has encouraged many small firms to go into drilling. When the day of licensing comes, they all hope to come in for their share of free-of-duty imported tubes and machinery, exemption from mining and business taxes and what else such law may have in store for them.

The present cabinet having given up the almost traditional policy of keeping liquid fuel prices down—market quotations are controlled by the government—and even contemplating higher import tariffs on petroleum products, business conditions of oil companies have become reassuring. Ever since world oil prices began to rise, local producers had been operating practically without profit.

Conditions under the new deal are vividly re-

JAPAN

OUTPUT OF CRUDE OIL BY PREFECTURES

(Unit: Kilolitre)

Year	Prefecture					
	Hokkaido	Akita	Yamagata	Niigata	Nagano	Shizuoka
1934	14,404	153,135	15	116,261	22	26
1935	13,396	231,377	18	106,119	24	24
	Total Output of Main Island				Formosa	Grand total
1934	283,863				5,577	289,440
1935	350,958				.....	350,958

flected by Tokyo stock exchange quotations for the shares of two leading producers, Nippon Oil Company and North Saghalien Oil.

The former, a 56,000,000-yen concern, is quoted in the neighborhood of 75 yen per piece against last year's low of 37.6. The dividend rate for the first half of 1936 was 7% against 5% for the second half of 1935. North Saghalien Oil shares sell now at par (50 yen), while they recorded 19.5 last year.

The Oriental Economist's index for the volume of industrial production, which is based on 1928=100, reflects the same trend in terms of output:

1935	1936						
Dec.	Jan.	Febr.	March	April	May	June	July
99	123	111	132	131	136	133	139

According to investigations conducted by the Japan Oil Company, wells with a daily output of

OUTPUT CRUDE OIL IN JAPAN BY FIELDS

(Unit: Kilolitre)

Name of Field	1934	1935
Innai	35,491	55,328
Nakano-Oguni	33,751	49,772
Niitsu	30,122	39,071
Toyokawa	38,346	27,623
Asahigawa	24,736	20,582
Kariu	21,670	16,123
Nishiyama	15,666	16,137
Higashiyama	11,562	12,165
Takamachi	9,965	7,756
Daimen	9,733	8,456
Yuri	8,546	7,213
Kanetsu	8,443	7,733
Atsushin	8,345	8,011
Ishikai	5,002	14,376
Betsuyama	4,847	3,304
Omonogawa	699	12,027
Dai Nihon Oguni	3,890	3,268
Ogura-Toyokawa	2,430	2,293
Yatsuhashi	1,823	43,353

20 kilolitres and over number only seven. The highest daily output during 10 days after successful completion was 60.60 kilolitres. All of them are located in the Kashiwazaki district in Niigata perfecture, and are drilled to depths ranging from 1,240 to 1,325 metres.

The most important news event of the current year was the consummation of the treaty signed at Moscow on October 10 by Vice-Admiral Masazo Sakonji, president of the North Saghalien Oil Co., and a representative of the Soviet Heavy Industry Commissary. This deal extends the period of oil prospecting in Northern Saghalien by the Japanese company for five years, or until the end of 1941, and entitles the Japanese interests to prospect, in addition to the eight districts which so far have been drilled or worked, in another seven districts.

Plans are now under way to push the drilling activity in that territory to a considerable degree. When the original exploitation license expired little was accomplished, though the Japanese government subsidized the enterprise to the amount of 4,600,000 yen every year.

Since the present treaty was signed, the firm has drilled 27 wells in 19 areas. The firm is prospecting extensively in Oha, where potential veins lie in deep strata, upper strata having already been superannuated. In Katangly, 21 tests will be bored toward the end of this year. Each of the working wells there is producing from 20 to 35 metric tons a day. Crude oil tanks, two in number, with a combined capacity of 30,000 tons, will be built there.

The total output during this year will be some 180,000 tons, about the same quantity as last year. Shipments to Japan have decreased during the past two or three years because the Soviet output has of late been shipped to Siberia to be refined there instead of being disposed of to the Japanese firm. Shipments of crude oil to Japan have been as follows[1]:

	Metric Tons
1932	313,000
1933	313,000
1934	241,000
1935	175,000

([1]NOTE: Northern Saghalien output is customarily included in the dates for domestic production, not in those for imported oil.)

It is worthy of note that the projected business is essentially a low stratum job, some of the wells going as deep as 1,250 metres.

Both the compulsory oil storage law, which after heated disputes has entered now upon the working stage, and the revision of market quotations for petroleum products have proved a boon to the local refinery business.

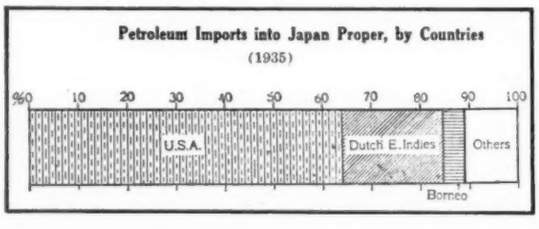
Many small refineries, most of them operating on a producing capacity of 500 to 1,000 kilolitres a month, have sprung up, mainly in and around Niigata City.

A list of the principal refineries, their locations, monthly capacities (in kilolitres), and the products distilled there follows:

Location Operating company	Monthly Capacity in kilolitres (in terms of crude oil)	Methods Employed and principal products
Kashiwazaki, Niigate Pref. Nippon Oil Co...	9,000	Gasol., Paraf.
Niigata City Nippon Oil Co.....	11,000	Schulz Vacuum Cracking, Cold. Settling
Tsuchisaki, Akita Pref. Nippon Oil Co...	18,000	Lubricants, Asphalts; Cold Settling
Tsurumi, near Yokohama Nipon Oil Co...	30,000	Dubbs, Cracking Process, N. N. O. Pipe Still
Yokohama Nippon Oil Co.	5,000	N. N. C. Cracking
Kawasaki, near Tokyo Mitsubishi Oil Co.	15,000	Kellog Pipe Steel, Cross Cracking System
Tokyo Sayama Oil Co.	7,000	Beckman Airless Cracking
Shimomatsu, Nippon Oil Co. Yamaguchi Perf.	30,000	Cross, Cracking Foster Pipe Still
Tokyo Ogura Oil Co.	7,200	Jenkins Cracking Schulz Airless Distillation
Yokohama Ogura Oil Co.	20,000	Schulz, Kellogg. Cross
Osaka Maruzen Mineral Oil Co.	5,000	Beckman
Tokuyama, Yamaguchi Pref. Imperial Navy ..... Fuel Depot	6 21,600	Trumble Topping Plant, Gasoline, Kerosene, Heavy Oil; Foster Pipe Still, and Gyro Cracking

In most of the small size fractionating plants not listed above the Beckman system is employed.

Towards the end of this year the Ogura Oil Co. will put into operation its new cracking plant built on the site adjoining its main factories at Tsurumi, near Yokohama. It is capable of cracking 180 kilolitres of crude a day, and is designed to produce a special quality of gasoline to be used for airplane engines.



The new cracking plant of the Nippon Oil Co., which was recently put into operation at Tsurumi, incorporates a remarkable novelty in cracking practice. The N. N. C. Process ("Nippon New Cracking") has no reaction chamber such as employed in Dubbs and Cross type plants. Reaction takes place in a furnace under a pressure of 500 lbs. per square inch, and the residue from lower boiling fractionation is again fed into the system, with the result that from 35% to 45% of gasoline are obtainable. The process was developed by Masakichi Mizuta, an engineer with Nippon Oil, and its major technical features are covered by Japanese Patent No. 106,745, with other patents still pending.

According to International Petroleum Trade of the U. S. Bureau of Mines the following crude oil and heavy oils were imported into Japan the first six months of 1936 and 1935 (data in barrels):

	1936	1935
Manchuria	240,000	132,000
British Borneo	945,000	472,000
Netherlands India	1,997,000	952,000
U.S.S.R.		15,000
United States	9,570,000	7,450,000
Miscellaneous	307,000	839,000
Total	13,059,000	9,860,000

Refined oils under 0.8762 specific gravity (gasoline and kerosene):

	1936	1935
British Borneo	1,000	5,000
Netherlands India	1,649,000	1,205,000
U.S.S.R.	81,000	33,000
Germany	3,000	3,000
United States	437,000	423,000
Miscellaneous	178,000	513,000
Total	2,349,000	2,182,000

Imports of other products were as follows:

	1936	1935
Medium gasoline	1,238,000	638,000
Heavy gasoline	914,000	1,259,000
Kerosene	197,000	285,000
Lubricating oils	146,000	94,000
Petrolatum (lbs.)	742,000	457,000
Paraffin wax (lbs.)	2,424,000	16,370,000

EXPORTS

Exports from Japan reported by the International Petroleum Trade for the first six months of 1936 and 1935 were as follows (barrels):

	1936	1935
Gasoline	.....	17,000
Kerosene	59,000	43,000
Machine oil	40,000	45,000
Miscellaneous	65,000	37,000
Grease (lbs.)	39,851	29,895
Asphalt (tons)	2,695	7,072

NEW REFINERY UNIT

Among the new processing units now being installed in Japanese refineries is the vacuum Coubrough distillation unit by the Lummus Co. at the Tokyo refinery of the Asano Bussan Co., Ltd.

This unit is designed to process 1,000 bbls. per day of Poso Creek crude to overhead cylinder stock, transformer oil, neutrals, gas oil and naphtha and low penetration asphalt. Poso Creek crude has the following characteristics:

Gravity	16.5 A.P.I.
Viscosity	79 SSU @ 210
Initial boiling point	340° F.
10 per cent point	505° F.
20 per cent point	593° F.
50 per cent point	830° F.

The products which will be obtained from this unit have the following characteristics:

	A.P.I. gravity	Viscosity
Naphtha distillate	38	
Gas oil	29.5	
Transformer oil	24.5	54 SSU @ 100
Light lube oil	22	80 SSU @ 100
Medium lube oil	18	60 SSU @ 210
Heavy lube oil	15	150 SSU @ 210
Asphalt	5.3	25 pen. @ 77

REFERENCE MATERIALS USED:

Sekiyu Binran, 1935; this publication deals with oil operations in Japan and abroad, but figures are lagging;

Sekiyu Jiho; a monthly published under the auspices of Nippon Oil Company; mainly technical;

Japan Advertiser Annual Review 1935-36;

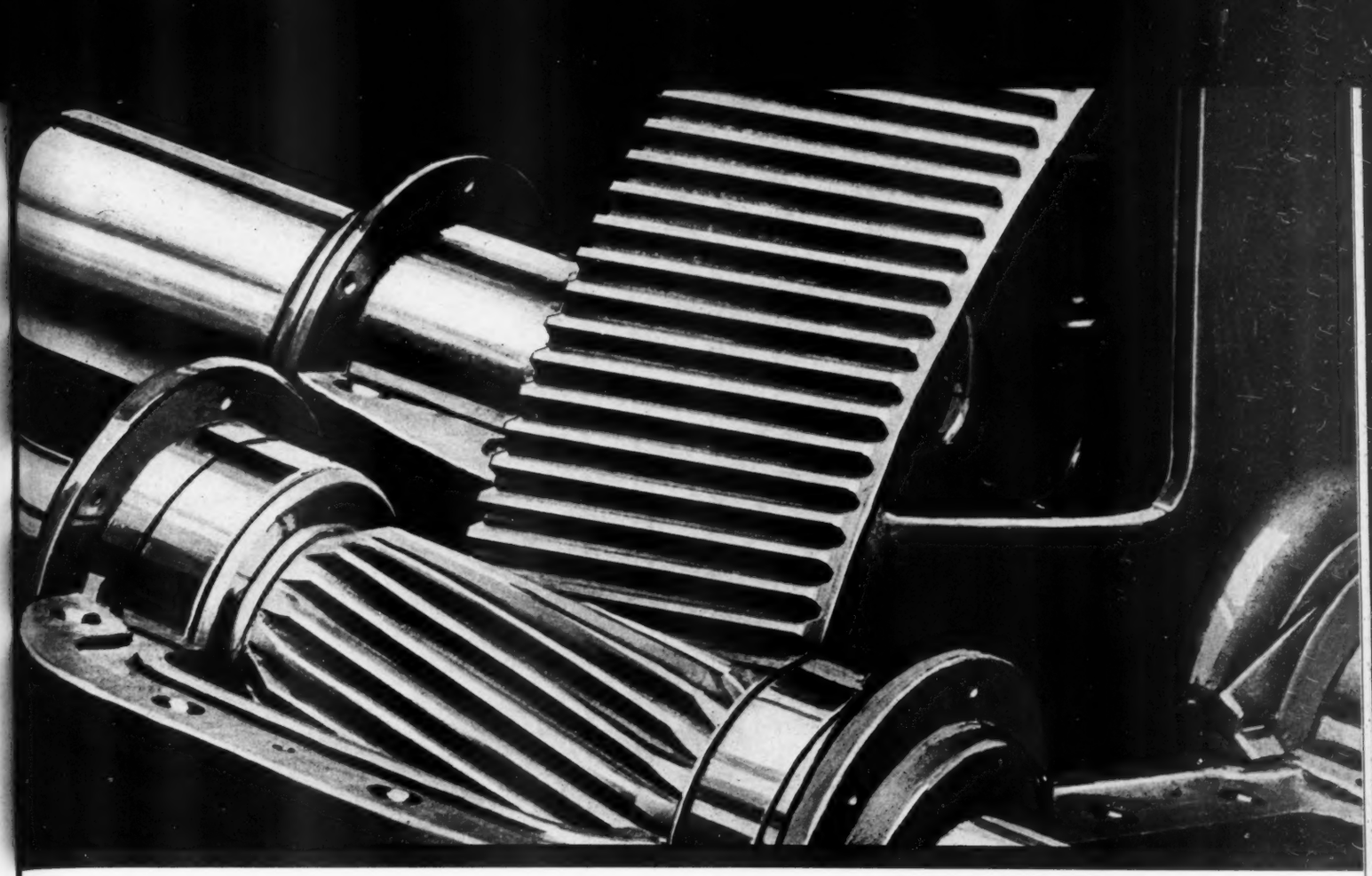
Oil Statistics, by Nippon Petroleum Co.;

Toyo Keizai, Daiamondo, and other magazines.

British Automobile Sales Set Record for 12 Months

British passenger car sales during the manufacturing year ended September 30, 1936, according to calculations based on Ministry of Transport figures recently issued, reached the record total of 295,964, compared with 266,617 in the previous corresponding period, an increase of 11 per cent. Sales of passenger cars, commercial vehicles and taxis in Great Britain and Northern Ireland during this period numbered 387,085 against 347,666, an increase of 11.3 per cent.

During the manufacturing year ended September, 1936, British motor vehicle production reached the highest figure ever attained. The total was 449,421, compared with 397,654 for the previous year. Passenger car production was 349,362 against 307,331, and commercial vehicle production 100,059 against 90,323.



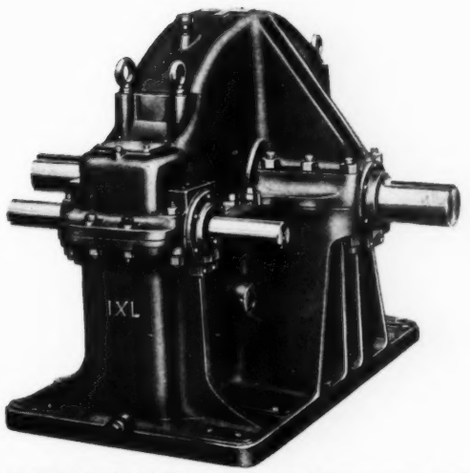
FOOTE BROTHERS IXL SPEED REDUCERS for PUMPING WELLS

IXL Helical Speed Reducers are designed for severe oil well pumping service and are built in single and double reduction units. Adaptable to any type of oilfield prime mover, they have a varied application to pumping problems over a wide speed range.

Operators are using these IXL Reducers for many types of hook-ups; From single well units to central geared plants pumping several wells at considerable distances apart.

IXL Units have proven trouble free and guarantee long and economical service.

Our engineers are at your command in selecting an IXL Speed Reducer to accomodate your prime mover to your pumping problem.



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The factory where IXL Reduction Units are made.

FRICK-REID SUPPLY CORPORATION

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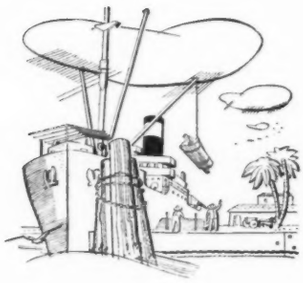
EQUIPMENT SUPPLIERS EXCLUSIVELY—STORES IN OLD AND NEW FIELDS



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CASING · DRILL PIPE · OIL WELL TUBING · LINE PIPE

Tests in England Going Deeper, Licenses Issued in New Area

Two wells are being drilled for oil in England, under the new petroleum law of 1934, by the D'Arcy Exploration Co., subsidiary of Anglo-Iranian Co. Both are on the south coast, one at Portsdown hill, Portsmouth, Hampshire, and the other at Henfield, Sussex. The Portsdown well, spudded last spring, is below 3,000 feet and in anhydrite. The Henfield well, begun in June, is below 2,100 feet. No attempt is being made to hasten drilling and considerable coring is being done.

This is the first systematic undertaking by an experienced oil company to test commercial oil possibilities in England. Between 1918 and 1922 a search for oil was begun on behalf of the government and 11 tests were drilled, 5 being carried below 4,000 feet and 3 between 3,000 and 4,000 feet. Several were drilled in the Pennine range between Sheffield and Derby, in Derbyshire, midland England. One well, No. 1 Hardstoft, produced oil in recoverable quantities in 1919 and has since continued to produce a small output of 40 Baume oil, high in lubricants and resembling Pennsylvania grade.

Crude oil production in England, practically all from the Hardstoft well, reached 225 tons in 1919 (from May to December), 375 tons in 1920; 350 tons in 1921; dropped to 125 tons in 1922, and 175 tons in 1923; rising to 325 tons in 1924 and 400 tons in 1925, but falling to 275 tons in 1926; 200 tons in 1927, and 25 tons in 1928. Production was shut in during 1929 and in 1930 was only 50 tons;

GREAT BRITAIN

85 tons in 1931; 97 tons in 1932; 50 tons in 1933; 25 tons in 1934, and 50 tons in 1935. This was a total of 2,932 tons or about 20,000 bbls.

The present drilling is under the regulations of 1935 based on the law passed in 1934, under which the government grants licenses for exploration. Licenses covering nearly 7,000 square miles were issued in 1935 and others have been granted since.

The first 30 prospecting licenses were granted to the D'Arcy Exploration Co., Ltd., development company of Anglo-Iranian Oil Co., Ltd., and covered 5,438 square miles in Surrey, Sussex, Hampshire, Dorset, Wiltshire, Yorkshire, Lincolnshire, Nottinghamshire, Leicestershire, Rutland, Cambridgeshire and Norfolk. An additional nine prospecting licenses were granted to D'Arcy company later or 1,508 square miles in Surrey, Sussex, Hampshire, Dorset, Wiltshire, Berkshire and Mid and East Lothian. Five licenses have been granted the Anglo-American Oil Co., Ltd., in Sussex and Southampton.

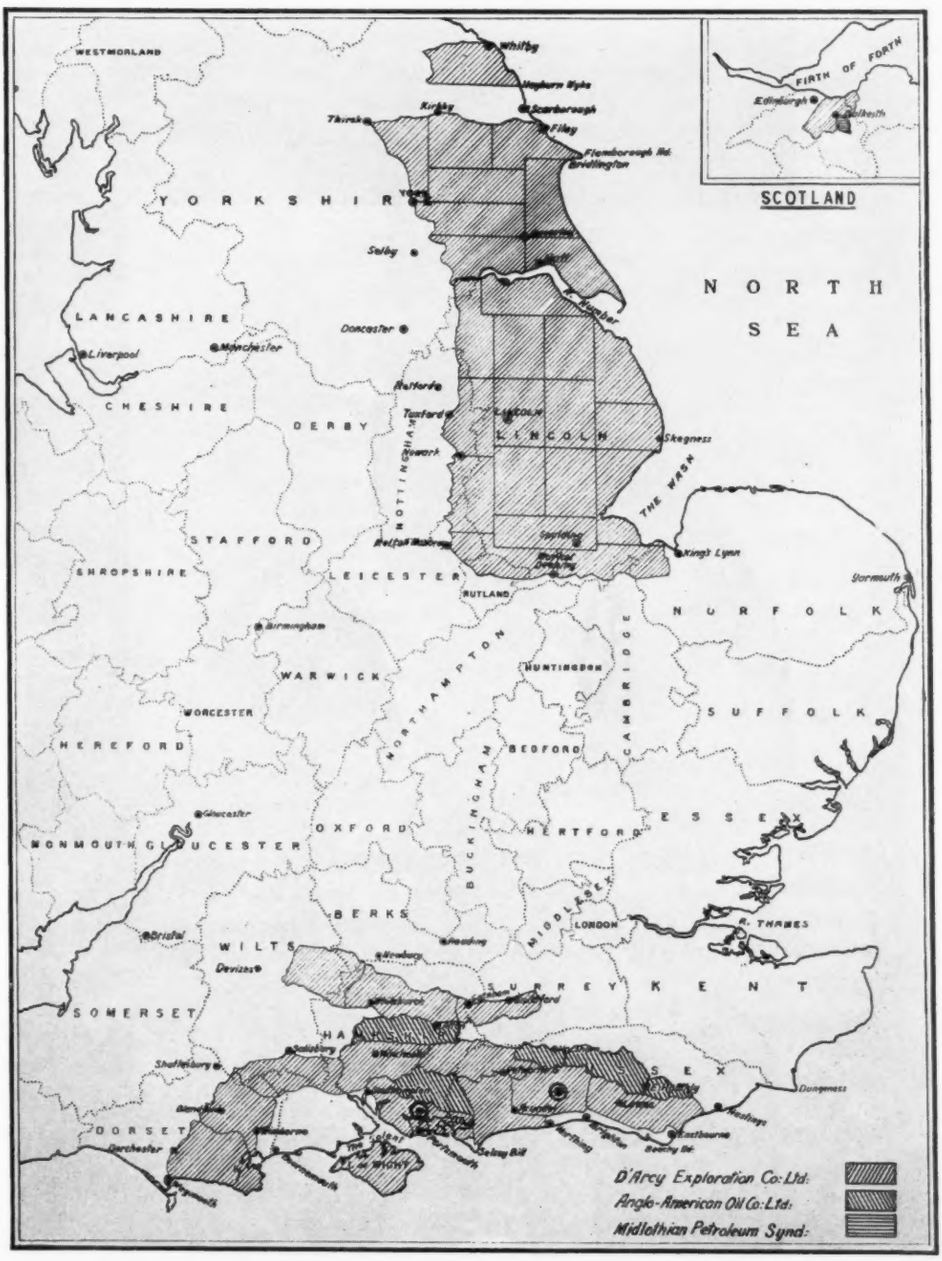
Another license was granted last October to E. H. Cunningham-Craig, geologist, and Major C. A. Pogson, as the Midlothian Petroleum Syndicate to carry on prospecting in Midlothian, Scotland, southeast of Edinburgh, where a test begun on the D'Arcy-Cousland anticline was drilled to 1,820 feet and abandoned in 1919, although indications of gas and oil were reported, 7 tons of oil being bailed.

The Broad of Trade has consented to the assignment to the Anglo-American Oil Co., Limited, the license previously granted under the Petroleum (Production) Act, 1934, and the Petroleum (Production) Regulations, 1935, to Major C. A. Pogson and E. H. Cunningham-Craig, Esq., carrying on business in partnership as the Midlothian Petroleum Syndicate. Notice of the board's consent has been published. The license covers approximately 12 square miles in the County of Midlothian.

While plans for an active drilling program get under way the United Kingdom continues to be dependent on the Scottish shale oil industry for its domestic supply of raw material. This industry has expanded in recent years.

In 1935, the latest official data available, the production of shale totaled a little less than 10,000,000 bbls. This year there has been an expansion in both mining and refining facilities and the year's production will be greater than in 1935.

According to a government report the production of crude oil and naphtha from the shale oil production last year totaled 30,250,000 imperial gallons. Considerable changes took place in the proportions of the various refined products obtained from the shale oil. This was mainly due to the increase in duty from 1d to 8d per gallon on imported heavy oil used in motor road vehicles. As a suitable diesel oil can be produced from shale oil, there has been a considerable increase in the production of this product at the expense of gasoline and fuel oil. This development has been reflected in the installation of new processing equipment at the Pumpherston refinery.



Drilling wells shown on south coast. Shaded areas indicate areas licensed for drilling by companies

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When the purchaser of pipe welding fittings specifies Midwest Welding Ells, he gets a number of "plus" values . . . features that add absolutely nothing to his cost.

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¼" per inch of fitting diameter. Advantages: (1) Pipe and Ell are lined up more quickly and accurately - thus reducing installation time and cost. (2) Short nipples and the extra welds they require are frequently eliminated. (3) Etc.

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When a 12" Midwest Ell is used, the tangents alone save 6" of pipe, while the radius of 1½ nominal diameters (instead of one nominal diameter) is responsible for an additional saving of 12" of pipe.

+ LARGE RADIUS

Radius is 1½ times nominal diameter instead of being only equal to nominal diameter. Larger radius makes welding more convenient and reduces installation time. It also saves pipe and eliminates excessive pressure drop.

+ DIMENSIONAL ACCURACY

and uniformity not otherwise possible result from final working in compression.

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Midwest Ells are first made slightly over-size. They are then reheated to a forging heat and reduced to correct size in compression.

+ UNIFORM WALL THICKNESS

results from the manufacturing process which is used exclusively by Midwest.

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No. 6—Tête Braden de type "C"—Elle est en acier coulé et prévue pour emploi dans les cas où il est nécessaire de suspendre le revêtement, et où on n'a pas besoin de tête du type coulissant. Elle est munie de garniture autour du revêtement et du collier, et prévoit un serre-garniture de presse-étoupe pour serre le bourrage.

No. 7—Suspenseur de revêtement de type "A" et pare-éclatement—Etudié pour *service extra-dur* avec une marge de sécurité amplement calculée, dépassant de beaucoup toute pression ou profondeur de puits connue à ce jour en forage. Il permet de faire descendre un revêtement à toute profondeur et de le suspendre au moyen de fourreaux sans devoir couper des raccords spéciaux. Eprouvé à 5.000 lbs. Garniture ignifuge spécialement adaptée.

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No. 9—Raccord de tige aspiratrice et racleur de paraffine—Un outil de grande adaptabilité, qui en réunit trois en un seul, employé avec succès comme guido de tige aspiratrice, racleur de paraffine et égaliseur de charge. En acier traité thermiquement d'une seule pièce résister au plus dur usage.

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No. 12—Bras oscillant—Il aide les pompes à fonctionner avec plus de douceur et d'efficacité, il supprime le cognement et tout bruit inutile, et facilite le réglage des soupapes. A peu près toutes les pièces mobiles sont entièrement enfermées pour les mettre à l'abri des matières étrangères. Installation facile.

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No. 2—Gancho de pared y zapatas fresadoras, que son intercambiables con la guía corriente instalada en el agarrador.

No. 3—Válvula de desahogo—Las ventas crecientes y en grande escala de estas válvulas constituyen evidencia convincente de su sobresaliente y seguro servicio. Debido a su sencilla construcción, son muy durables y a prueba de manos inexpertas. Aseguran un funcionamiento perfecto, a bajo costo.

No. 4—Válvula y asiento de bomba de barro—Ofrecen la certeza de eliminar todas las molestias corrientes que se experimentan con las válvulas y asientos de construcción ordinaria. Precisas, pero con un mímero mínimo de piezas expuestas al desgaste, a fin de asegurar su prolongada duración y un funcionamiento satisfactorio.

No. 5—Carretel automático—A causa de su mayor velocidad de funcionamiento, seguridad para el personal, eficaz protección a la maquinaria y gran duración, este carretel automático ha tenido una aceptación universal. Tiene conexión de 4 puntos y desconexión de dos puntos. Está constituido por nueve piezas, de las cuales sólo cinco son de movimiento.

No. 6—Cabeza Braden de tipo "C"—Se hace de acero fundido y está especialmente proyectada para emplearse en los casos en que es necesario suspender el revestimiento, o cuando no hay necesidad de una cabeza de tipo corredizo. Está provista de empaquetadura alrededor del revestimiento y del collar, y va provista también de casquillo de prensaestopa para cerrar bien la empaquetadura.

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No. 11—Tapón cónico—Un eficaz tapón de tres pasos, que se emplea para la pesca de las uniones o juntas de herramientas, tubos de perforación, extremos torcidos de uniones de herramientas y todo otro objeto por atraparse en el interior. De acero especial, que se dobla antes de partirse, con una masa suficiente para permitir su fácil rehabilitación.

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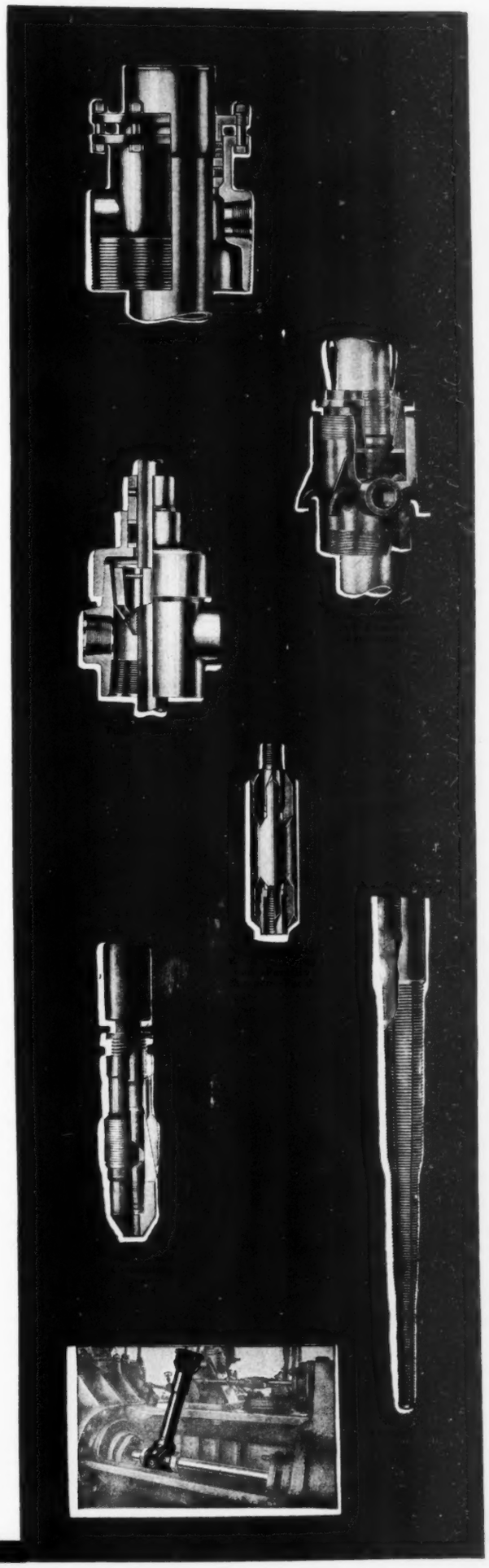

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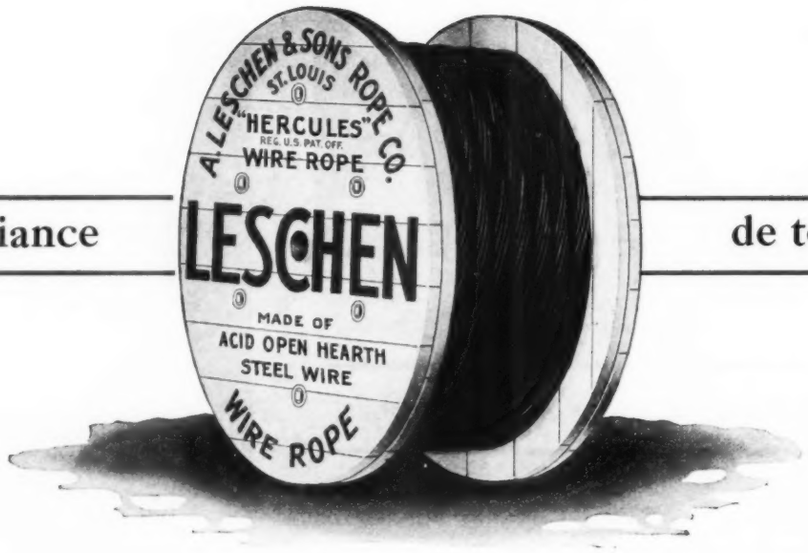

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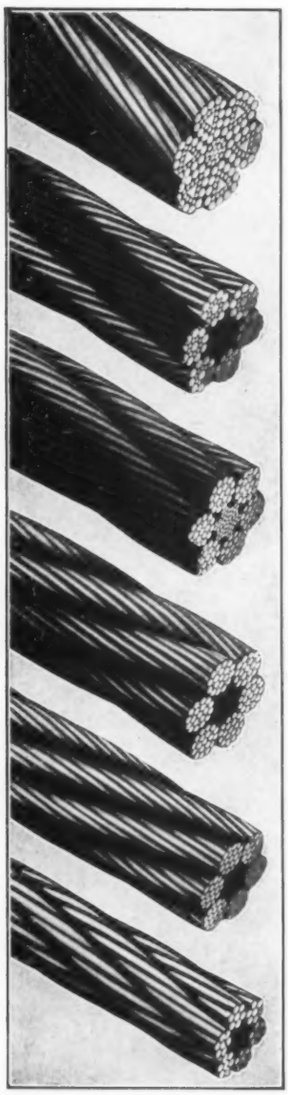

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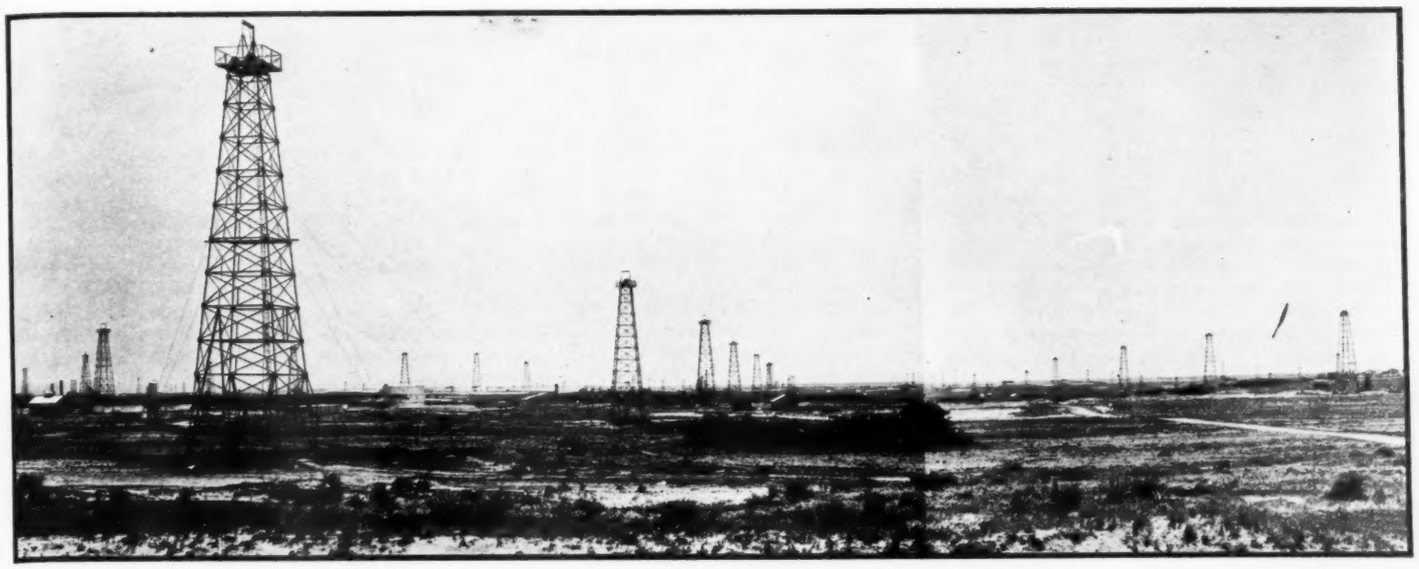

Modern Trends in Production Practice

GENERAL

The new conception of the ideal method of developing oil fields and producing oil wells contemplates the conservation of natural reservoir energy through proper well spacing, and regulates production by maintenance of reservoir pressure and control of gas-oil ratios. Under such conditions lower costs in producing oil from flowing wells may be obtained and the capital invested in development held at a minimum.

Recent studies of flowing conditions in many wells in widely separated fields have proved the value attainable by application of these principles and it is believed new fields will be governed largely by these newer methods. Benefits will accrue to landowners, operators and to state and federal governments interested in the mineral rights.

Analyses of data secured during these tests on wells flowing under widely different producing conditions show the gas-oil ratio has a greater effect on pressure differences in the tubing than does the tubing size or rate of flow. The ratio of free gas to amount of gas in solution is also an important factor.

Pressure drop in tubing is not caused entirely by friction, as usually assumed, but is a combination of the effect due to friction and the difference in pressure created by fluid head. The difference in pressure is due mostly to the actual pressure head, and because of this the gas-oil ratio exerts an important effect through aeration of the column and consequent changes in the static head.

Tubing size has little effect except for very large or for small rates of flow, and will tend to equalize, because as the pipe size is increased the friction decreases, but the slippage increases, so the net change is unimportant compared with other factors.

As these many advantages through modern engineering production methods have been better understood by executives there has been a tendency to reverse the former order of applying engineering principles to hasten immediate recovery regardless of ultimate yield. The industry is now striving to use natural energy to assist in recovery of as much gas and oil as possible. As production methods have been improved there has been a tendency to look more closely into drilling costs and well

Les Tendances Moderne en la Production Practique

EXPOSE GENERAL

La nouvelle conception de la méthode idéale d'exploitation des champs pétrolifères et des puits de pétrole envisage la conservation de l'énergie naturelle du gisement par l'espacement rationnel des puits, et règle la production en maintenant la pression propre au gisement et en contrôlant les rapports gaz-pétroles. En procédant ainsi, on peut s'assurer des frais d'exploitation réduits dans la production du pétrole émanant de puits jaillissants, et on peut réduire au minimum les capitaux immobilisés dans cette exploitation.

De récentes études des conditions d'écoulement dans de nombreux puits, pris dans des champs très éloignés les uns des autres, ont mis en évidence tout l'intérêt qui s'attache à l'application de ces principes, et l'on pense que l'exploitation des nouveaux chantiers s'inspirera dans une large mesure de ces méthods récentes. Parmi ceux qui en bénéficieront, citons les propriétaires du sol, les exploitants, les gouvernements d'état et fédéral intéressés aux droits sur les richesses minérales.

Il ressort des analyses des données recueillies par ces essais sur des puits jaillissant dans des conditions de production très diverses, que la rapport gaz-pétrole a un effet plus sensible sur les différences de pression dans le tubage que le calibre du tubage ou la vitesse de l'écoulement. Un autre facteur important est le rapport entre les gaz libres et la quantité de gaz en solution.

Les chutes de pression dans le tubage ne sont pas causées uniquement par le frottement, ainsi qu'on le suppose en général, mais résultent de l'effet combiné du frottement et de la différence de pression causée par la tête du fluide. La différence de pression est due surtout à la tête de pression réelle, et c'est à cause de cela que le rapport gaz-pétrole a un effet important par l'aération de la colonne et les changements en résultant dans la tête statique.

Le calibre du tubage n'entre guère en jeu, sauf dans les cas de vitesses d'écoulement très fortes ou très faibles, et a un effet équilibreur, car, avec l'augmentation de calibre du tuyau, le frottement diminue, mais par contre le glissement ou patinage

Nuevas Practicas en Produccion

DECLARACIONES GENERALES

La nueva concepción del método ideal de explotación de campos petrolíferos y de pozos de petróleo comprende la conservación de la energía natural del yacimiento, mediante una separación racional de los pozos, y la regulación de la producción, mediante el mantenimiento de la debida presión de los pozos y control adecuado de la relación entre el gas y el petróleo. Procediéndose de esta manera, se reducen los gastos de explotación en la producción del petróleo proveniente de pozos activos, y por otra parte, se puede también reducir a un mínimo el capital invertido en el trabajo.

Por recientes estudios de las condiciones de extracción en numerosos pozos situados en campos muy alejados los unos de los otros, se ve evidente el interes general que se está dando a estos principios, y es lógico asumir que la explotación de nuevos yacimientos se inspirará, en gran medida, en estos métodos más racionales. Entre los que se beneficiarán se hallarán los propietarios del terreno, los explotadores y los gobiernos nacionales y departamentales con derechos sobre las riquezas minerales.

Del análisis de todos los datos provenientes de los estudios de numerosos pozos activos, sujetos a diversas condiciones de producción, se ve que la relación entre el gas y el petróleo tiene un efecto más sensible sobre las diferencias de presión en la tubería, que el calibre de la tubería o la rapidez del flujo. Otro factor importante es la relación existente entre los gases libres y la cantidad de gas en solución.

El decaimiento de presión en la tubería no es causado únicamente por el rozamiento, como generalmente se asume, sino que resulta efecto combinado del rozamiento y de la diferencia de presión creada por la carga hidrostática. La diferencia de presión se debe, sobre todo, a la carga hidrostática presente ye es por esta razón que la relación entre el gas y el petróleo tiene un efecto importante, debido a la aeración de la columna y los consiguientes cambios que se producen en la carga estática.

El calibre de la tubería tiene muy poco efecto, salvo en los casos de flujos muy rápidos o muy lentos, presentando una influencia equilibradora, pues con el aumento en diámetro de la tubería, se disminuye el rozamiento, aumentándose correspondientemente el deslizamiento, de modo que la

spacing representing capital investment and it is now found by application of proper recovery methods close well spacing is unnecessary and, by combining wide spacing and conservation of reservoir energy while producing the oil, it is possible to make larger net earnings.

For several years petroleum engineers have been faced with serious problems in developing leases through the drilling of many wells that were not necessary so far as future recovery of gas and oil was concerned. It was fully appreciated the ever-mounting total of wells was reducing the allowable production per well to such a small number of barrels per day as to defer return on capital invested far beyond the time when it would have been returned if it had been possible to increase the daily earnings from each well.

WELL SPACING

Well spacing is now a definite part of the program of all companies and, while it is still agreed it is not possible to lay down a formula to cover all fields, it is known that in proper well completion, using cores of the producing formation to determine the physical characteristics of the gas, oil and reservoir rock, it is now possible to arrive at a very safe estimate of distance between wells to permit drainage.

When it is remembered nature probably moved any body of gas and oil now capable of making a commercial oil field some distance from the source beds to the place of accumulation, certainly many times farther than it will be necessary to move the oil within the drainage area in any reasonably well spaced oil field, it is very apparent that, under proper control of producing conditions and conservation of natural and physical conditions in the reservoir, it should be possible to deliver the maximum quantity of the gas and oil to the bottom of the flow string in the well.

It is very evident that in any underground reservoir the ratio of gas to oil, the percentage of gas in solution in the oil, and the other physical conditions set up while the gas and oil were being accumulated, are the maximum which may be expected in that particular field. With this 100 per cent condition as the basis for all calculations to be made for drilling and production methods to follow in the development it is clear the longer the natural reservoir conditions can be maintained the longer the gas and oil will be retained in their most mobile state and free to move to the well bore with the least use of natural energy.

Great advances have been made in the study of reservoir conditions and through application of geophysical methods it is possible to map the structure accurately enough to permit location of wells to the best advantage, outlining the producing formation fully and then drilling only such additional wells as actually needed to recover the maximum oil and gas. Under such development each well would be permitted to produce a sufficient quantity each day to repay the cost within a reasonable time.

CONSERVATION OF GAS

Maintenance of reservoir pressure well above that critical pressure at which the gas comes out of solution in the oil within the formation keeps the oil in as near its original mobile state as possible. Actual tests have demonstrated the gravity of the oil will be higher under such production conditions than if the oil is produced at too high a rate. With fewer wells drilled into the reservoir it is possible to better maintain these ideal underground conditions of pressure and gas solution and it is believed by many a field operated under these ideal conditions will give up practically all of its

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augmente, de sorte que la différence nette est insignifiante par rapport à l'effet des autres facteurs.

A mesure que ces nombreux avantages, réalisables par l'application des méthodes de production de la technique moderne, ont été mieux saisis par les chefs de maisons, on a eu de plus en plus tendance à renverser l'ordre ancien d'exploitation qui mettait en jeu des principes techniques visant à produire le plus possible sur le champ sans 'inquiéter du rendement final. Au contraire, l'industrie moderne s'efforce de tirer parti de l'energie naturelle au maximum en la conservant aux fins de recueillir le plus possible de pétroles et de gaz naturels. Au fur et à mesure que les méthodes de production ont été améliorées, on a eu de plus en plus tendance à examiner de plus près les éléments des frais de forage. Or, l'espacement des puits représente des capitaux engagés, et comme d'autre part on a récemment découvert que, par l'application de méthodes rationnelles d'extraction, il n'y a plus lieu de disposer les puits en formation serrée, on peut dire que, par la combinaison de l'espacement augmenté entre les puits et la conservation de l'énergie naturelle du gisement pendant l'extraction du pétrole, on a pu réaliser des profits nets plus grands dans l'exploitation.

Depuis plusieurs années, les ingénieurs du pétrole se trouvaient constamment aux prises avec de sérieux problèmes dans l'exploitation des terrains de concessions pétrolifères par suite du forage de nombreux puits qui étaient inutiles du point de vue de l'extraction future de pétroles et de gaz. En effet, on s'est rendu compte que le nombre total sans cesse croissant de puits réduisait la production possible par puits à un nombre si faible de barils par jour que la rémunération du capital engagé se trouvait différée bien au-delà du moment où cette rémunération aurait pu être touchée si l'on avait pu augmenter le rapport journalier de chaque puits.

ESPACEMENT DES PUITS

L'espacement des puits constitute maintenant une partie essentielle du programme d'exploitation de toutes les compagnies et, bien qu'il soit admis qu'il n'est pas encore possible de donner une formule unique convenant à tous les champs pétrolifères, on sait que par une étude rationnelle de la disposition des puits, en prélevant des carottes ou échantillons de la formation exploitée pour déterminer les caractéristiques physiques des gaz, des pétroles et les rocks du gisement, on est maintenant à même de déterminer avec une précision satisfaisante la distance à réserver entre les puits de forage pour en assurer l'épuisement convenable.

Lorsqu'on veut bien se rappeler que la Nature a fort probablement déplacé les masses de gaz et de pétroles qui forment maintenant des champs pétrolifères d'exploitation commerciale depuis les couches d'origine jusqu'à l'endroit d'accumulation, et cela sur des distances souvent multiples de celles envisagées lors de l'extraction où il s'agit seulement de déplacer le pétrole dans les limites du champ exploité foré de puits de pétrole rationnellement espacés, il devient clair que, par un contrôle approprié des conditions de production et par la conservation des conditions naturelles et physiques du gisement, on doit pouvoir amener à la base du faisceau tublaire d'écoulement du puits une quantité maximum de gaz naturels et de pétroles.

Il est, en effet, évident que dans tout gisement our réservoir pétrolier souterrain, le taux du gaz par rapport au pétrole, le pourcentage du gaz en solution dans le pétrole, ainsi que les autres conditions physiques déterminées par l'accumulation des gaz et des pétroles lors de la formation du gisement, sont à leur maximum dans la poche souterraine du champ considéré. Cette condition idéale ou 100 pour cent devant servir de base dans tous les calculs à faire pour le forage et la production, et la détermination des méthodes à

(Continué sur Page 155)

diferencia neta es insignificante, en comparación con la influencia de otros factores.

A medida que estas numerosas ventajas, realizables por la aplicación de modernos métodos de producción natural, han llegado al conocimiento de los jefes de empresas explotadoras, se ha observado la tendencia hacia alterar el antiguo método de explotación, que se valía de principios técnicos mecánicos, para acelerar, lo más que se pudiera, la extracción inmediata, sin preocuparse del posible rendimiento final. Por lo contrario, la industria moderna se esfuerza por sacar partido de la energía natural, para obtener un rendimiento máximo de gas y de aceite. Con el mismo perfeccionamiento de los métodos de producción se ha presentado la tendencia hacia estudiar más detenidamente los elementos de costo de la perforación y el capital invertido en la separación de pozos. Se ha visto ahora que con la aplicación de adecuados métodos de extracción, resulta innecesaria la poca separación entre los pozos y que combinando una amplia separación entre los pozos con la conservación de la energía natural del yacimiento, durante la extracción del petróleo, se puede obtener una ganancia neta mucho más grande de la explotación.

Durante muchos años, los ingenieros de petróleo han venido luchando con serios problemas en la explotación de terrenos de concesiones petrolíferas, a consecuencia de la perforación de numerosos pozos que han sido inútiles, desde el punto de vista de futura extracción de petróleo y gas. En efecto, se han dado cuenta de que el creciente número de pozos ha venido reduciendo la producción posible de cada pozo a un limitado número de barriles diarios, postergándose así la ganancia racional sobre el capital invertido en la empresa, cosa que generalmente no sucede cuando se limita el número de pozos y se obtiene de cada uno el mayor rendimiento posible.

SEPARACION DE LOS POZOS

La distancia entre los pozos constituye ahora una consideración esencial en el programa de explotación de todas las compañías, y aunque se admite que todavía no es posible dar una fórmula única, que convenga a todos los campos petrolíferos, con el estudio de las muestras de la formación explotada, para determinar las características físicas del gas, del petróleo y de las rocas del yacimiento, se puede efectivamente determinar con bastante precisión, la distancia que debe reservarse entre los pozos de perforación, para obtener de ellos el mayor rendimiento posible.

Cuando recordamos que la naturaleza probablemente movió las masas de gas y de petróleo, que son ahora capaces de constituir un explotación petrolífera comercial, cierta distancia desde los lechos de origen hasta el punto de acumulación, ciertamente mucho más lejos que las trazadas dentro del área de extracción de un campo bien distribuído, se presenta entonces, muy evidente, que bajo un acertado control de las condiciones productivas y la conservación de las condiciones naturales y físicas en el yacimiento, resulta posible extraer, por en fondo de la tubería en el pozo, una cantidad máxima de gas y petróleo.

Es, en efecto, evidente que en todo yacimiento o depósito subterráneo de petróleo, la relación entre el gas natural y el petróleo, el porcentaje de gas en solución en el petróleo y las demás condiciones físicas establecidas durante la acumulación de gas y de petróleo, se presentan aquí en el grado máximo que puede esperarse de ese campo. Con esta condición ideal, o 100% perfecta, como base de todos los cálculos por hacerse en relación a la perforación y métodos de producción por seguirse en la explotación, se presenta evidente que mientras más tiempo se mantengan las condiciones naturales del yacimiento, más tiempo se retendrá el gas y el petróleo en su mejor estado de movilidad, lo que

(Continué en Página 155)

REED
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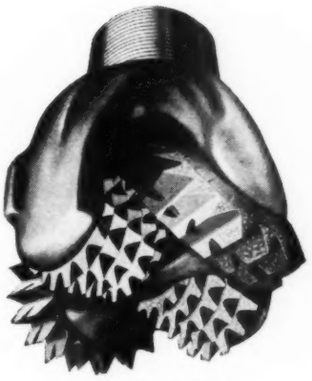
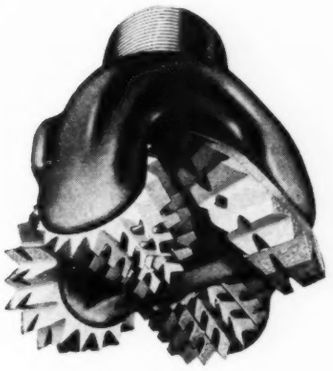
SPEED-ECONOMY
DURABILITY

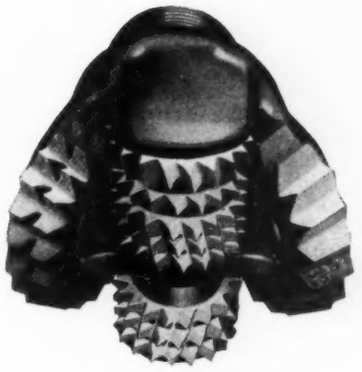
REED DK ROLLER BITS



REED DK-1
For Broken and Medium Hard Formations



REED DK-2
For Hard Formations



REED DK-3
For Extremely Hard and Unusually Abrasive Formations

The Reed DK roller bit is the latest development in roller bits by the Reed Roller Bit Company incorporating all of the experience gained from previous models of roller bits plus improved metallurgy in the bit cutters, hard surfacing of the cutter teeth and in particular the incorporation of greatly improved bearing assemblies.

The Reed DK roller bit is equipped with the regular Sport Model roller bearings plus the new ball thrust bearing, providing more bearing under the cutters and holding them in true frictionless alignment, thus extending the cutter life to give a materially increased total footage per bit.

The three cutter assemblies shown above are the results of experimentation with and standardization from many hundreds of differently designed cutter assemblies and cutter tooth actions tested in all known formations.

Le trépan à galets Reed DK est le tout dernier perfectionnement en trépans à galets réalisé par la Reed Roller Bit Company et profite de l'expérience tirée de modèles précédents de trépans à galets, jointe à une métallurgie perfectionnée des fraises de trépan, à un surfaçage durcisseur des dents de fraise, et en particulier à l'introduction de paliers parfaitement au point.

Le trépan à galets Reed DK est muni de roulements à galets ou rouleaux du modèle Sport courant, ainsi que d'un nouveau palier à butée à billes, ce qui offre une plus grande surface de palier sous les fraises et les maintient rigoureusement en ligne et sans frottement, d'où prolongation de la vie utile des fraises se traduisant par de nouveaux records de travail accompli par trépan.

Les trois groupes de fraisage représentés ci-dessus sont le résultat de l'expérimentation et de la standardisation appliquées à des centaines de groupes de fraisage de construction différente, ainsi que de l'étude de l'action des dents de fraise essayée dans toutes les formations connues.

La barrena de rodillo Reed DK es el más reciente perfeccionamiento en barrena da su clase, realizado por la Reed Roller Bit Company. En ella se comprende toda la experiencia ganada en los modelos precedentes de barrenas de rodillo, más una metalurgia mejorada en la fabricación de fresas, mejor endurecimiento superficial de los dientes de fresa y en particular, la incorporación de cojinetes notablemente refinados.

La barrena de rodillo DK está provista de los cojinetes de rodillos de tipo o modelo Sport corriente, más un nuevo cojinete de bolas de empuje, lo que provee una superficie de cojinete más grande debajo de las fresas, manteniéndolas, al mismo tiempo, en exacta alineación, sin rozamiento, lo que sirve para prolongar la duración útil de las fresas, cosa que se ha comprobado ya por los admirables registros de trabajo hecho por cada una.

Los tres grupos de fresas mostrados arriba representan los resultados de los experimentos y de la normalización aplicados a centenares de grupos de fresas de construcción diferente, lo mismo que de profundos estudios de la acción de los dientes de fresa ensayados en todas las formaciones conocidas.

REED ROLLER BIT COMPANY

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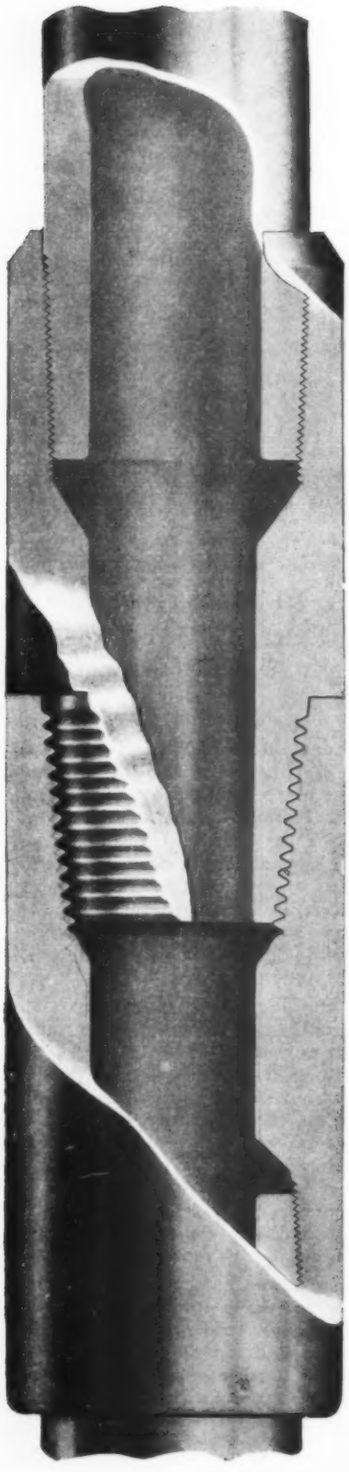
DURABILITY



REED TOOL JOINTS

Reed Tool Joints are manufactured from only the highest quality of carefully selected chrome nickel alloy steel.

Reed Tool Joints are a precision product, manufactured with rigid inspection control of every operation from the rough and finished turning of the forgings, threading and heat-treating to the finished product. Each pin and box is considered as a separate product which must be brought up to the high standards required of Reed Tool Joint specifications.

Unusually close tolerances are held to in machining and extreme caution exercised in threading to assure as near perfect thread structure as possible, thus assuring Tool Joints of such uniformity that interchangeability is assured.

Les joints d'outils Reed sont uniquement fabriqués à parti de la plus haute qualité d'acier spécial au nickel-chrome soigneusement sélectionné.

Les joints d'outils Reed sont un produit de précision, fabriqués sous un contrôle rigide de chaque opération depuis le tournage brut et fini des pièces de forge, jusqu'au produit fini, en passant par les opérations du filetage et du traitement thermique. Chaque goupille et chaque coussinet sont traités comme des produits séparés, qui doivent être amenés au niveau des standards élevés imposés par les spécifications des joints d'outils Reed.

Des tolérances exceptionnellement petites sont observées pendant l'usinage, et des précautions infinies sont prises pendant le filetage, afin d'obtenir une structure de filetage aussi près de la perfection que possible, d'où la production de joints d'outils d'une telle uniformité que l'interchangeabilité en est assurée.

Las juntas de herramientas Reed se fabrican únicamente de la más alta calidad de acero especial al níquel y cromo elegido con sumo cuidado.

Las juntas de herramientas Reed son productos de gran precisión, que se fabrican con un control rígido de cada operación, desde el labrado y acabado bruto de las piezas forjadas, hasta el producto completamente terminado, después de su fileteado o rosca y tratamiento térmico. Cada espiga y cada cojinete o soporte se tratan como productos separados, que deben conformarse exactamente con todas las elevadas normas impuestas por las exigentes especificaciones de las juntas de herramientas Reed.

Durante el labrado se observan sólo mínimas tolerancias, tomándose toda precaución posible durante el roscado, a fin de obtener una estructura de rosca lo más perfecta posible, para asegurar así la producción de juntas de herramientas de una uniformidad que permita un intercambio o permutación fácil y correcto.

WHEREVER THERE IS ROTARY DRILLING

REED
ROTARY DRILLING TOOLS
SPEED-ECONOMY
DURABILITY

REED KOR-KING CORE DRILL

The Reed Kor-King is an outstanding development in Core Drills resulting from prolonged and intensified field research and testing, whereby greater certainty of core recovery has been accomplished. Simplicity of construction and ease of handling on the derrick floor are the outstanding features. A choice of either an outside vent, inside vent or drop ball type is provided.

The Kor-King Hard Formation Cutter Head has six roller type cutters, having highly efficient alternate right and left angle cut teeth, hard surfaced with Reedite for long wear. Cutters for sizes 7⅝" and larger have roller bearings. Cutters for small sizes have Stellite anti-friction bearings.

The Kor-King Soft Formation cutter heads are inter-changeable with the Hard Formation cutter heads and are furnished in two types, the standard type which has teeth cut around the crown or core cutting edge and the solid crown type which has a continuous beveled inner edge. This solid crown type is used for extremely soft formations or loose sand.

Some features of the Reed Kor-King are: non-rotating core catcher—non-rotating inner barrel—outside vent releasing the pressure above the core—improved rust-proof, toggle type core catcher—core catcher protector—increased diameter cores—core drill elevator, eliminating handling with catline.

Write for Bulletin No. 362 for complete information on the Reed Kor-King.

Le Kor-King Reed marque un progrès marqué en matiére de forets carottiers, résultat de recherches en chantier et d'essais soutenus et multipliés, grâce auxquels on a réussi à augmenter la certitude du prèlévement satisfaisant d'une carotte ou échantillon. La simplicité de la structure et la facilité de maniement sur le plancher de la chèvre en sont les avantages principaux. Un choix soit d'un orifice extérieur, soit d'un orifice intérieur, soit d'un orifice intérieur, soit d'un type à rotule à chute, est prévu.

Les têtes de fraisage Kor-King pour formation molles sont interchangeables avec les têtes de fraisage pour formation dures, et sont fournies en deux types, à savoir le type standard qui a des dents taillées autour de la couronne ou bord découpeur de carrotte, et le type à couronne massive qui a un bord intérieur chanfreiné et continu. Ce type à couronne massive est employé pour les formations extrêmement molles ou pour travailler en sable mou.

Principales caractéristiques du Kor-King Reed: dispositif carottier non rotatif—baril intérieur non rotatif—orifice extérieur relâchant la pression au-dessus de la carotte—dispositif carottier anti-rouille perfectionné, du type articulé—protecteur de dispositif carottier—carottes d'un diamètre plus fort—élévateur de foret carrotier, supprimant le maniement d'une ligne de prélèvement.

Demandez-nous notre Bulletin No. 362 pour des détails complets sur le Kor-King Reed.

La Kor-King Reed representa un progreso notable en materia de barrenas o taladros tubulares, resultado de muchas investigaciones en campos de trabajo y ensayos prácticos, bajo diversas condiciones, gracias a los cuales se ha logrado aumentar la certeza de obtener con facilidad muestras satisfactorias. La sencillez de la construcción y la facilidad del manejo sobre el piso del armazón de taladrar son sus ventajas principales. Se ofrece en tipo de orificio exterior, de orificio interior o de bola de caída.

Las cabezas fresadoras Kor-King para formaciones blandas son intercambiables con las cabezas fresadoras para formaciones duras, y se suministran en dos tipos, que son, el tipo normal, que tiene dientes tallados alrededor de la corona o borde cortador de muestra, y el tipo de corona maciza, que tiene un borde interior achaflanado y continínuo. Este tipo de corona maciza se emplea en formaciones extremadamente blandas y para trabajar también en arena suelta o floja.

Entre las principales caracterísicas de la Kor-King Reed se hallan; recojedor de muestra sin rotación, barril interior sin rotación, orificio exterior de escape de presión encima de la muestra, recojedor de muestra inoxidable de tipo articulado perfeccionado, protector de recojedor de muestra, muestras de un diámetro más grande, elevador de barrena o taladro tubular, que hace innecesario el empleo de una línea de levantamiento.

Pídanos nuestro boletín No. 362, que contiene información detallada sobre la Kor-King Reed.

SOFT FORMATION CUTTER HEAD INTERCHANGEABLE ON THE SAME BARREL

REED DROP BALL TYPE KOR-KING WITH HARD FORMATION HEAD

REED INSIDE VENT KOR-KING WITH HARD FORMATION HEAD

REED OUTSIDE VENT KOR-KING WITH HARD FORMATION HEAD

REED ROLLER BIT COMPANY

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DURABILITY

REED
HEAVY DUTY
6-CONTACT
REAMER

REED
HEAVY DUTY
3-CONTACT
REAMER

REED SHORT BIT
REAMERS
for use as a guide at any location in the drill stem. Furnished to your specifications.

REED HEAVY DUTY REAMERS

Rotary Reamers, pioneered and developed by the Reed Roller Bit Company now have a proven value in Straight Hole Drilling, for keeping the hole to Full Gauge and for keeping the walls of the *hole true and in Good Condition.* The importance of using Reamers becomes greater with Deeper Drilling.

Reed Reamers used in conjunction with drill collars stiffen the drill stem to where rotation on true center is effected at both low and high rotary speeds. Reed Reamers are frequently used in tandem and separated with drill collars.

For Concentrating the Drilling Weight at the drilling bit a Reed reamer is used immediately above the drilling bit to concentrate the drilling weight perpendicularly on the bit, which causes the bit to dig ahead efficiently on its guided straight course.

For full gauge smooth wall holes, Reed reamer cutters are so designed that in addition to drilling off all projections and roughness left from the drilling bit, they drill out all spiral serrations that might be left from the drilling bit, to leave a smooth wall full gauge hole.

Reed Reamers are forged from chrome nickel alloy steel, carefully machined, heat-treated in electrically operated, automatically controlled furnaces, and threaded to suit your individual requirements. The bearing blocks holding the reamer cutter assembly are especially case hardened and embedded into the tough, strong reamer body by welding, so that there are no loose bushings nor loose parts to be lost in the hole while drilling. Only the finest of selected alloy steels, carefully and scientifically heat-treated are used in the manufacture of Reed reamer cutter assemblies, to provide in the simplest construction with the least number of parts, rotary reamers of greatest dependability and highest efficiency.

Les alésoirs rotatifs, créés et perfectionnés par la Reed Roller Bit Company, ont démontré leur valeur dans le forage des trous rectilignes, à savoir pour maintenir le trou de forage à la cote intégrale et pour maintenir les parois *du trou conformes et en bon état.* L'importance qu'il y a à faire usage d'alésoirs devient plus grande encore pour le forage profond.

Les alésoirs Reed, employés concurremment avec des colliers de forage, raidissent la tige de forage là où la rotation sur centre conforme s'effectue aux vitesses rotatives tant faibles qu'élevées. Les alésoirs Reed sont fréquemment employés en tandem et séparés par des colliers de forage.

Afin de concentrer le poids de forage au trépan de forage, on a recours à un alésoir Reed immédiatement au-dessus du trépan de forage afin de concentrer le poids de forage perpendiculairement par rapport au trépan, ce qui fait que le trépan attaque la formation avec efficacité sur le parcours rectiligne qui lui est tracé.

Pour les trous de forage à parois lisses à la cote intégrale, les fraises d'alésoirs Reed sont conçues telles que, outre qu'elles suppriment toutes les saillies et ruguosités laissées par le trépan de forage, elles font disparaître toutes les stries en spirale qui peuvent avoir été laissées par le trépan de forage, d'où il résulte en fin d'opération un trou de forage à la cote intégrale et à parois lisses.

Les alésoirs Reed sont forgés à partir d'acier spécial au nickel-chrome, puis usinés avec soin, traités thermiquement dans des fours électriques, à contrôle automatique, enfin filetés conformément aux besoins particuliers. Les blocs de palier qui supportent l'ensemble fraise d'alésoir sont spécialement cémentés et encastrés dans le corps d'alésoir à la fois robuste et tenace, de sorte qu'on n'a pas à craindre de perdre des coussinets ou autres pièces amovibles dans le puits de forage en cours d'opération. On n'emploie dans la fabrication des ensembles de fraises d'alésoir Reed que des aciers spéciaux très sélectionnés et traités thermiquement avec contrôle scientifique, afin d'obtenir des alésoirs rotatifs d'un maximum de simplicité de construction et d'un minimum de piéces constitutives, se signalant par le plus haut degré d'efficacité et de régularité.

Los escariadores rotativos, creados y perfeccionados por la Reed Roller Bit Company, han demostrado su valor en la perforacción de pozos rectilíneos, tanto para mantener el agujero de perforación a su anchura completa, como para conservar las paredes del agujero *conformes y en buen estado.* La importancia del aprovechamiento de escariadores se hace todavía más grande al tratarse de perforar a gran profundidad.

Los escariadores Reed, empleados conjuntamente con collares de perforación, refuerzan el vástago de la barrena cuando la rotación en centro exacto se efectúa a velocidades rotativas altas o moderadas. Los escariadores Reed se emplean con frecuencia en tandem o separados con collares de perforación.

Con el objeto de concentrar el peso de la perforación en la barrena de perforar, se emplea un escariador Reed immediatamente arriba de la barrena, recayendo, de esta manera, el peso de la perforación, perpendicularmente sobre la barrena, lo que permite a la barrena cortar la formación con eficacia, sobre el curso rectilíneo que se le ha trazado.

Para los agujeros de perforación de tamaño completo y paredes lisas, las fresas de los escariadores Reed están dispuestas de tal manera que, además de suprimir las salientes y rugosidad dejadas por la barrena perforadora, hacen desaparecer todas las estrías en espiral que pudieran haber quedado después del paso de la barrena, de lo que resulta, al final del trabajo, un agujero perforado a tamaño exacto, con paredes bien lisas.

Los escariadores Reed se hacen de una especial aleación de acero al níquel y cromo. Se labran con sumo cuidado, se tratan térmicamente en hornos eléctricos de control automático, luego se roscan de acuerdo con las necesidades particulares del interesado. Las piezas que sirven de soporte al grupo de fresas del escariador reciben cementación o endurecimiento superficial y se aseguran al firme y resistente cuerpo del escariador, de modo que no hay que temer que se pierdan los cojinetes u otras partes amovibles, en los pozos de perforación, durante el curso del trabajo. En la fabricación de los grupos de fresas de los escariadores Reed se emplean únicamente los aceros especiales más adecuados prolijamente escogidos y tratados térmicamente en hornos de control automático, a fin de obtener escariadores rotativos de construcción extremadamente sencilla, con el menor número posible de piezas constituyentes, que se caracterizen por máximo grado de eficacia y seguridad.

WHEREVER THERE IS ROTARY DRILLING

REED
ROTARY DRILLING TOOLS
SPEED-ECONOMY
DURABILITY

REED B-R DRILLING BIT WITH WIRE LINE RETRACTABLE CORE BARREL

The Reed Barrett-Robishaw drilling bit with wire line retractable core barrel, for drilling and coring in either hard or soft formations. Drilling is identical as with any conventional type of rotary drilling bit. When a core is desired the Kelly is set aside just long enough to drop the complete core barrel, (shown at the right) down inside the drill pipe. The Kelly is replaced and drilling proceeds in the usual manner until sufficient amount of hole is cut to provide the length of core desired. To recover the core barrel, with its core, the overshot is lowered inside the drill pipe on a wire line and the core barrel brought to the derrick floor—*any number of cores may be taken, at any depths, without removing the drill pipe.* The hard and soft formation heads shown at the right are inter-changeable and the center bit assembly is sometimes used while drilling in extremely sticky formations to divert and concentrate slush action against the drilling bit blades, or to drill up cores formed and not wanted in hard formations. It is dropped into position and recovered in the same manner as the core barrel assembly. For complete details write for the Reed B-R Bulletin.

Le trépan de forage Barrett-Robishaw de Reed, avec baril carottier rétractable sur câble métallique, est prévu pour le forage et le prélèvement de carottes tant dans les formations dures que molles. Le forage est identique à celui effectué au moyen de n'importe quel trépan rotatif de forage du type courant. Lorsqu'on désire faire le prélèvement d'une carotte, le Kelly est disposé de côté de façon à avoir une longueur suffisante pour laisser descendre le baril carottier tout entier (représenté à droite) à l'intérieur du tuyau de forage. On replace alors le Kelly, et on procède au forage de la manière habituelle jusqu'à ce qu'un trou de forage suffisant ait été aménagé pour permettre le prélèvement d'une carotte de la longueur désirée. Afin d'extraire avec succés le baril carottier, avec sa carotte, on fait descendre le dispositif pêcheur à l'intérieur du tuyau de forage au bout d'un câble métallique et on amène le baril carottier sur le plancher de la chèvre—*on peut ainsi prélever autant de carottes que l'on veut, à toutes les profondeurs désirées, sans devoir sortir le tuyau de forage.* Les têtes pour formations dures et molles, représentées à droite, sont interchangeables, et le trépan central complet est parfois employé au cours du forage dans des formations particulièrement tenaces, afin de faire dévier et concentrer l'action des boues contre les lames du trépan de forage, ou encore pour extraire des carottes formées et non désirées dans des formations dures. On le fait descendre en position et on l'extrait de la même manière que le dispositif dit pêcheur. Pour avoir des détails complets, demandez le Bulletin Reed B-R.

La barrena de perforación Barrett-Robishaw de Reed tiene barril de muestra retractable, en cable metálico, y sirve para cortar y levantar muestras de formaciones duras y blandas. La perforación es igual a la efectuada por cualquier taladro o barrena rotativa de tipo corriente. Cuando se desea levantar una muestra, el Kelly se aparta durante un tiempo suficiente para permitir el descenso del completo barril de muestra (como se ilustra a la derecha) por el interior del tubo de perforación. Se repone en seguida el Kelly y se procede a la perforación de la manera corriente, hasta que se haya hecho un agujero conveniente para la extracción de una muestra de la longitud deseada. Con el objeto de extraer con éxito el barril recojedor de la muestra, junto con la muestra, se hace descender el dispositivo pescador por el interior del tubo de perforación, al extremo de un cable metálico, y con la ayuda de este cable se sube el barril a la plataforma del armazón de taladrar. *Se puede así levantar el número de muestras que se quiera, a diferentes profundidas, sin quitar el tubo de perforación.* Las cabezas para formaciones duras y blandas, mostradas a la derecha, son intercambiables, y la barrena central completa se emplea, a veces, en el curso de una perforación en formaciones particularmente tenaces, a fin de desviar y concentrar la acción de los barros contra las hojas o láminas de la barrena, o bien, para extraer muestras formadas y no deseadas, en formaciones duras. Se le hace descender en posición y es extraído de la misma manera que un dispositivo pescador. Para información detallada, sírvase pedirnos nuestro boletín Reed B-R.

HARD FORMATION HEAD WITH CORE BARREL IN POSITION | CORE BARREL ASSEMBLY | CENTER BIT ASSEMBLY | B-R DRILL COLLAR AND SOFT FORMATION HEAD

REED ROLLER BIT COMPANY

REED
ROTARY DRILLING TOOLS
SPEED-ECONOMY
DURABILITY

REED STEP REAMER
OR
HOLE OPENING BIT

The Reed Step Reamer or Hole opening bit is used for enlarging hole. Where a large diameter hole is desired it is often advisable to first drill a small hole and then ream it to the desired diameter. It is also used to ream down core holes and the pilot insures following the course of the original hole. Any type pilot desired can be furnished.

L'alésoir à gradin Reed ou trépan élargisseur de trou est employé pour élargir le trou de forage. Lorsqu'on désire un trou de fort diamètre, on a souvent intérêt à forer tout d'abord un trou de faible calibre, puis à l'aléser pour atteindre le diamètre désiré. On l'emploie aussi pour aléser le parcours des trous de carottage, et le guide prévu donne la certitude qu'on suit bien la direction du trou original. Tout type de guide désiré peut être fourni.

El escariador graduado Reed o barrena para abrir hoyos se usa para agrandar agujeros. Cuando se necesita un hoyo de mayor diámetro, se recomienda, a menudo, perforar primero un agujero pequeño y luego escariarlo hasta obtener el diámetro final deseado. Esta herramienta se emplea también para escariar los hoyos perforados para sacar muestras, y la guía provista da la seguridad de que el escariador seguirá bien la dirección del agujero original. Podemos suministrar cualquier tipo de guía o piloto que se necesite.

REED
ALLOY STEEL HEAT-TREATED DRILL COLLARS

Reed Drill Collars are carefully forged from selected chrome nickel alloy steel of the same high quality and toughness used in the manufacture of Reed Reamers and Reed Tool Joints. They are heat-treated in electrically operated automatically controlled, double chambered heat-treating furnaces and are manufactured to A.P.I. design or your specifications.

Les colliers de forage Reed sont forgés avec soin à partir d'acier spécial au nickel-chrome de grand choix, qui est de la même qualité supérieure et a le même degré de ténacité que celui employé dans la fabrication des aléseurs Reed et des joints d'outils Reed. Ces colliers sont traités thermiquement dans des fours électriques spéciaux, à double chambre, et à contrôle automatique, et sont fabriqués au standard de l'A.P.I. ou d'aprés vos propres spécifications.

Los collares de perforación Reed se forjan con sumo cuidado, de especial aleación de acero al níquel y cromo de calidad escogida, igual, en este sentido, al excelente material que se emplea en la fabricación de los escariadores y de las juntas de herramientas de marca Reed. Estos collares son tratados térmicamente en hornos eléctricos especiales, de doble cámara y de gobierno automático, y se fabrican según el trazado o patrón de la A.P.I. o de acuerdo con las especificaciones del interesado.

REED WELDED-IN
BLADE DRILLING BITS

A new replaceable blade scrape type bit. The bit blades are drop forged of alloy steel, heat-treated and dressed with hard abrasive inserts. The drilling bit is redressed by removing the blades with a cutting torch and welding in new blades, thus providing new forged, heat-treated alloy steel hard surfaced blades for every run of the bit. Machined to standard A.P.I. pin or box connections with either 2, 3 or 4 blades.

Voici un nouveau trépan de type racleur à lames remplaçables. Les lames de trépan sont estampées à partir d'acier spécial traité thermiquement et dotées de garnitures rapportées en abrasif dur. Le trépan de forage est remis en état en enlevant les lames au moyen d'un chalumeau découpeur, puis en y soudant à l'autogène de nouvelles lames, ce qui munit le trépan de nouvelles lames à surface dure, en acier spécial forgé et traité thermiquement, travaillant à chaque avance du trépan. Usiné aux standards A.P.I. avec raccords à goupilles ou à coussinets et avec 2, 3 ou 4 lames.

Un nuevo tipo de barrena o broca raspante de láminas reemplazables. Las láminas o dientes de la barrena son estampados de acero especial tratado térmicamente, y llevan un revestimiento insertado de material abrasivo muy duro. Esta barrena de perforación puede rehabilitarse quitándole las láminas mediante un soplete de cortar, y luego, colocándole láminas nuevas mediante soldadura autógena. De este modo, la barrena queda provista de nuevas láminas con superficie endurecida, de acero especial forjado y tratado térmicamente, para cada diente de la herramienta. Se ofrecen labrados a máquina, para ajustar en espigas o cojinetes normales A.P.I., con 2, 3 o 4 láminas.

REED ROLLER BIT CO.
LOS ANGELES HOUSTON OKLAHOMA CITY NEW YORK

Distributed through Supply Companies Everywhere

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oil to the bottom of the hole without use of mechanical means of lifting it to the surface. Whether this desired result would be attained is not yet demonstrated but it is known the flowing life of wells will be materially lengthened and, if they are not opened at periodical intervals for potential tests, the movement of water into and through the reservoir will be controlled and this water movement made to assist in driving the oil to the well bore. With the body of gas and oil held in front of the advancing wall of water, the water will not have the tendency to cone around the well and cut off valuable production but will move into the space formerly occupied by gas and oil gradually and assist in clearing the pores of the formation of these desirable hydrocarbons.

Control of rate of gas and oil movements within the reservoir can be attained by proper use of flow beans either in the bottom of the flow string or at the surface between well head and oil and gas separators. The use of tubing for flow string is always desirable, and, as it is improbable any new field will be permitted to produce at its maximum capacity for some time because of daily demand for oil being limited, tubing will serve for flow string better than the larger casing. The size of the tubing and position of the bottom of the string can be determined by analysis of reservoir characteristics and, if the diameter of the hole and the size of the strings of casing used in all wells in each field are maintained uniform, every operator will have equal chance to recover his just share of the oil accumulated under each operator's surface holdings. With wider well spacing drainage areas around each well will not interfere with each other and areas of unequal formation pressure will not be set up causing gas and oil to migrate across surface boundaries and be lost to its rightful owner.

The conditions outlined may seem highly theoretical but no one interested in recovery of oil can deny the desirability of securing the highest possible yield from the reservoir at the lowest outlay of capital and production costs. With mounting taxes, long deferred returns upon the investments are undesirable, and to meet taxes, which means providing revenue for the state and for the landowners who are thereby relieved of other tax burdens, the application of modern development and production methods is becoming more and more necessary. These necessities will require the application of knowledge gained through the production of all kinds of oil pools in the past and from those experiences determining unfavorable past practices and eliminating them and applying those better suited to present general conditions.

STEAM DRILLING

To meet competition in rotary drilling the manufacturers of steam equipment offered greatly improved boilers and accessories. Because of limitations as to simplicity, portability, and the type of work to be done, the drilling rig power plant cannot include all of the refinements of the high efficiency stationary plant but the basic principles can be applied without sacrificing simplicity, portability, or other desirable features.

Some of the major advantages now offered for steam plants for drilling include feedwater heaters, boiler efficiency, superheating, slush pump prime mover, rotary prime mover and boiler and steam line insulation.

The size of the boiler plant has been reduced from three or four 125 horsepower boilers to two, and in one instance one 125-horsepower 350-pound pressure boiler, for a 6,000-foot hole. Sufficient heat conservation has been attained to reduce the boiler capacity required for the average rig about 50 per cent. Another item credited to the modern steam

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adopter, il est clair qu'au plus longtemps on réussit à maintenir les conditions idéales du gisement ou réservoir naturel, au plus longtemps on pourra conserver le gaz naturel et le pétrole dans leur meilleur état de mobilité, permettant de les amener au puits de forage avec un usage minimum d'énergie naturelle.

On a fait de très grands progrès dans l'étude des conditions des réservoirs pétroliers, et, par l'application des méthodes géophysiques, il est maintenant possible de dresser un plan assez exact de la structure du sous-sol pour permettre de situer les puits aux endroits les plus favorables, de faire le croquis complet du gisement producteur, puis de ne forer que le nombre nécessaire de puits additionnels pour extraire le maximum de gaz naturel et de pétrole. Selon ces méthodes rationnelles, chaque puits est appelé à produire chaque jour une quantité suffisante pour assurer la rémunération du capital dans un temps raisonnable.

CONSERVATION DES GAZ

En maintenant la pression du réservoir pétrolier sensiblement au-dessus de la pression critique à laquelle le gaz s'échappe du pétrole qui l'a dissous dans le gisement, on conserve le pétrole dans un état de mobilité aussi voisin que possible de son état de mobilité d'origine. On a prouvé par des essais en pratique que la densité du pétrole extrait dans de telles conditions de production est plus forte que si le pétrole était produit à une cadence trop précipitée. En forant un nombre plus réduit de puits dans le gisement, il est possible de mieux maintenir ces conditions souterraines idéales de pression et de solution des gaz, et de nombreux exploitants sont d'avis qu'un champ exploité dans ces conditions idéales est à même d'abandonner à peu près tout son pétrole à la base des puits forés, et cela sans avoir recours à l'emploi de moyens mécaniques pour l'élever jusqu'à la surface du sol. On n'a pas encore prouvé que ces résultats très désirables sont entièrement obtenus en pratique, mais chacun sait que la vie utile ou durée de jaillissement des puits en sera nettement prolongée, et, si on ne les ouvre pas à intervalles périodiques pour faire des essais potentiels, on pourra aussi contrôler le mouvement de l'eau dans le réservoir et à travers ce réservoir ou gisement, et on pourra avoir recours à cette circulation d'eau pour aider à chasser le pétrole jusqu'au puits de forage. La masse du gaz naturel et du pétrole étant poussée par le mur d'eau qui avance, l'eau n'aura pas tendance à tourner autour du puits et ainsi à enrayer une précieuse production pétrolière, mais se déplacera graduellement en prenant successivement la place occupée précédemment par le gaz naturel et le pétrole, ce qui aidera à extraire des pores de la formation exploitée tous les carbures d'hydrogène désirables.

Aux fins de régler les vitesses de circulation des gaz et des pétroles dans le réservoir ou gisement, on peut se servir de flotteurs appropriés qu'on dispose soit au fond du faisceau tubulaire d'ecoulement, soit à la surface entre la tête du puits et les séparateurs de pétrole et de gaz. L'emploi de tubage pour le faisceau d'écoulement est toujours désirable, et comme il n'est pas probable qu'aucun nouveau champ de pétrole ne sera autorisé à produire à sa capacité maximum avant un certain temps à cause des restrictions demandées journellement pour la production du pétrole, on peut dire que le tubage servira mieux le faisceau d'écoulement que le revêtement plus large. On peut déterminer la taille du tubage et sa position à la base du faisceau extracteur par l'analyse des caractéristiques du réservoir ou gisement, et, si le diamètre du trou de forage et la taille des faisceaux de revêtement employés dans tous les puits de chaque champ pétrolifère sont maintenus uniformes, tout exploitant aura une chance égale de recueillir sa juste part des pétroles accumulés

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permitirá traer estos productos a los pozos perforados, con un so o consumo mínimo de energía natural.

Se han hecho grandes progresos en el estudio de las condiciones de los yacimientos petroleros. Mediante la aplicación de métodos geofísicos, es ahora posible levantar un plano de la estructura, que resulta bastante exacto para determinar la posición de los pozos de más conveniente perforación, trazar la completa formación productiva y perforar después sólo aquellos adicionales pozos que verdaderamente se necesiten para la extracción máxima del gas y del petróleo. Según estos métodos racionales, cada pozo está llamado a producir cada día una cantidad suficiente para asegurar una conveniente remuneración sobre el capital invertido, dentro de un tiempo razonable.

CONSERVACION DEL GAS

Manteniendo la presión del yacimiento bien arriba de la presión crítica, bajo la cual el gas se desprende de su solución en el petróleo retenido en la formación, el petróleo se conserva entonces en un estado de movilidad muy próximo a su estado de movilidad original. Se ha visto, por ensayos prácticos, que la densidad del petróleo extraido bajo semejantes condiciones de producción, es superior a la del petróleo forzado a mayor presión. Perforando un número más reducido de pozos en el yacimiento, se hace posible mantener mucho mejor estas condiciones subterráneas ideales de presión y de solución de gas. Muchos explotadores son de la opinión que un campo explotado bajo estas condiciones ideales entregará casi todo su petróleo al fondo del pozo, sin necesidad de recurrir a medios mecánicos para levantarlo a la superficie. Aunque todavía no se ha demostrado que estos resultados tan apetecidos se repiten invariablemente en la práctica, existe, sin embargo, una aceptación casi unánime del hecho de que la existencia productiva de los pozos, explotados según estos modernos métodos de conservación, se prolonga considerablemente. Además, cuando no se abren a intervalos periódicos, para ensayos potenciales, se puede controlar el movimiento del agua por el yacimiento o depósito, haciéndo que este movimiento de agua ayude a empujar el petróleo hacia el pozo. La masa de gas natural y petróleo, quedando empujada por un muro de agua que avanza, significia que el agua no presenta la tendencia a pasar alrededor del pozo, interrumpiendo una valiosa producción, sino que pasará al espacio antes ocupado por el gas y el petróleo, haciéndolo gradualmente y ayudando así a extraer de los poros de la formación explotada todos estos convenientes hidrocarburos.

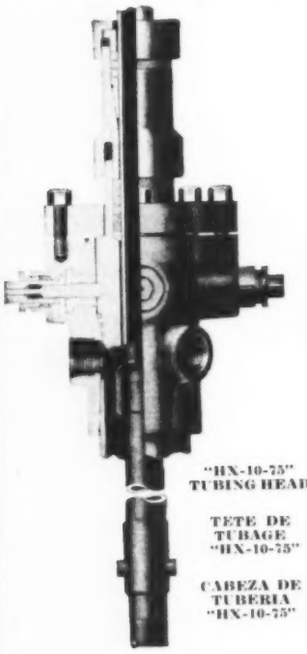
A fin de regular las velocidades de la circulación del gas y del petróleo en el yacimiento o depósito, se puede emplear algún adecuado tipo de flotador, que se coloca al fondo de la tubería o bien, en la superficie, entre la cabeza del pozo y los separadores de gas y petróleo. El empleo de tubería para la circulación es siempre conveniente. Como lo más probable es que ningún campo petrolífero reciba autorización para producir a su capacidad máxima, hasta después de cierto tiempo, a causa de las restricciones impuestas periódicamente sobre la producción de petróleo, se puede decir que la tubería sencilla de circulación servirá mejor que el sistema más grande de revestimiento. El diámetro de la tubería y su posición al fondo pueden determinarse por un cuidadoso análisis de las características del yacimiento. Si el diámetro del agujero perforado y el tamaño de la tubería o revestimiento, de todos los pozos de un campo petrolífero, se mantienen uniformes, todo explotador tendrá entonces igual oportunidad de recojer su justa parte del petróleo acumulado debajo de la extensión territorial de su concesión. Gracias a la mayor distancia o separa-

(Continué en Página 161)

CASING AND TUBING HEADS

TETES DE TUBAGE ET DE REVETEMENT

CABEZAS DE TUBERIA Y DE REVESTIMIENTO



"HX-10-75" TUBING HEAD

TETE DE TUBAGE "HX-10-75"

CABEZA DE TUBERIA "HX-10-75"

TYPE "HX-10-75" TUBING HEAD

Used with blowout preventers to drill in, run tubing, set packer and re-work well under pressure. Provided with means for setting packer. 5000 pounds test pressure.

TYPE "HX-10-70" TUBING HEAD

Used with blowout preventers to drill in and run tubing under pressure where it is unnecessary to set packer. J-tool hanger of "HX-10-75" can bo used in this Head should it become necessary to set packer later. 5000 pounds test pressure.

TYPE "PX-23" TUBING HEAD

1500-pound test pressure. Suspends tubing by means of slips. Stuffing box above slips.

TYPE "PX-75" TUBING HEAD

5000-pound test pressure. Metal seal ring, made integral with bonnet, seals off in machined groove on top of body. Case hardened slips are extra long to prevent crushing pipe. Regular stuffing box above slips.

TYPE "HZ" CASING HEAD

Used with blowout preventers for drilling and running casing against pressure. Inside diameter of body same as that of casing on which it screws. No split rings to pack off. Blowout preventer adapter flange bolts down on metal seal ring of standard size. 6000 pounds test pressure.

TYPE "HY" CASING HEAD

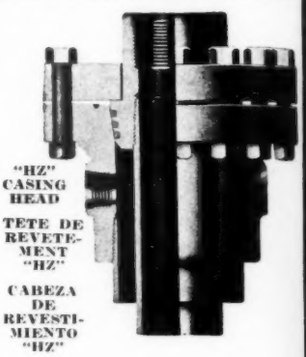
Used with blowout preventers for drilling in and landing casing under pressure. Auxiliary stuffing box above hanger. Hanger threaded female at top for nipple to tubing head, or for setting another Casing Head. 5000 pounds test pressure.

TYPE "HZP" COMBINATION CASING AND TUBING HEAD

Permits drilling and landing casing through blowout preventers. Inner string screws into tapered hanger which packs off in body. After well is drilled in, Tubing Head body bolts down on metal seal ring in place of blowout preventer adapter flange. Tubing is suspended in same manner as casing in Casing Head. All connections flanged. Christmas-tree connection and Tubing Head outlets flanged if desired. 6000 pounds test pressure.

LOUISIANA PATTERN CASING HEAD

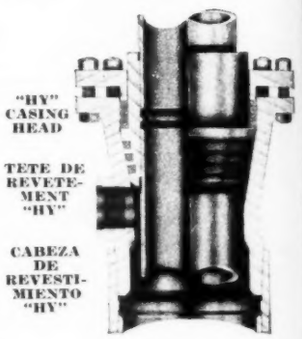
Collar of inner string rests on top of split gland, compressing packing in stuffing box to effect seal. 4000 pounds test pressure.



"HZ" CASING HEAD

TETE DE REVETEMENT "HZ"

CABEZA DE REVESTIMIENTO "HZ"



"HY" CASING HEAD

TETE DE REVETEMENT "HY"

CABEZA DE REVESTIMIENTO "HY"

TETE DE TUBAGE TYPE "HX-10-75"

Employé avec pare-éclatements pour forer, enfoncer le tubage, poser le bourrage et réexploiter le puits sous pression. Pourvu de moyens pour la pose du bourrage. Pression d'essai de 5000 lbs.

TETE DE TUBAGE TYPE "HX-10-70"

Employé avec pare-éclatements pour forer et enfoncer le tubage sous pression là où il n'est pas nécessaire de poser de bourrage. Support d'outil en J de "HX-10-75" peut s'employer sur cette tête, s'il devient nécessaire par la suite de poser du bourrage. Pression d'essai de 5000 lbs.

TETE DE TUBAGE TYPE "PX-23"

Pression d'essai de 1500 lbs. Suspend le tubage au moyen de fourreaux. Presse-étoupe au-dessus des fourreaux.

TETE DE TUBAGE TYPE "PX-75"

Pression d'essai de 5000 lbs. Segment d'étanchéité en métal, faisant corps avec la coiffe, assure une parfaite obturation dans la rainure usinée à la partie supérieure du corps. Fourreaux cémentés extra-longs pour rendre impossible l'écrasement du tuyau. Presse-étoupe habituel au-dessus des fourreaux.

TETE DE REVETEMENT TYPE "HZ"

Employé avec pare-éclatements pour forer et pour poser le revêtement en présence de pression. Même diamétre intérieur du corps que celui du revêtement sur lequel il se visse. Aucun segment fendu à garnir de bourrage. La bride de fixation du pare-éclatement se boulonne sur segment d'étanchéité en métal de dimension standard. Pression d'assai de 6000 lbs.

TETE DE REVETEMENT TYPE "HY"

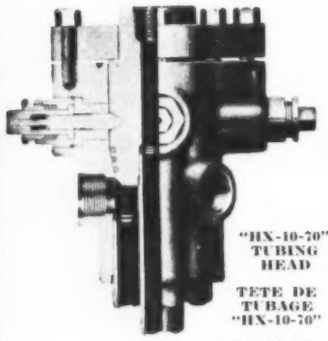
Emplové avec pare-éclatements pour forer et pour poser le revêtement sous pression. Presse-étoupe, auxiliaire au-dessus du support de suspension. Filetage femelle prévu à la partie supérieure du support pour raccord à la tête de tubage, ou pour la pose d'une autre tête de revêtement. Pression d'essai 5000 lbs.

COMBINAISON TETE DE TUBAGE ET DE REVETEMENT TYPE "HZP"

Elle permet de forer et de poser le revêtement par le moyen de pare-éclatements. Le faisceau intérieur se visse dans le support de suspension conique qui se garnit dans le corps. Aprés qu'on a foré le puits, le corps de la tête de tubage se boulonne sur le segment d'étanchéité en métal à la place de la bride de fixation du pare-éclatement. Le tubage se suspend de la même manière que le revêtement dans la tête du revêtement. Tous les raccords sont bridés. Raccord "arbre de Noël" et orifices de sortie de tête de tubage sur demande. Pression d'essai 6000 lbs.

TETE DE REVETEMENT MODELE LOUISIANE

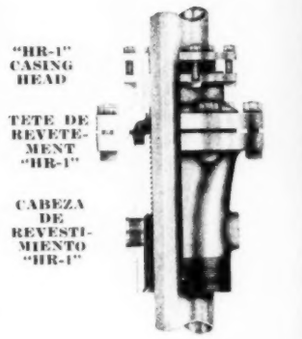
Le collier du faisceau intérieur repose sur le dessus du serre-garniture sectionné, comprimant la garniture dans le presse-étoupe d'où étanchéité parfaite. Pression d'essai de 4000 lbs.



"HX-10-70" TUBING HEAD

TETE DE TUBAGE "HX-10-70"

CABEZA DE TUBERIA "HX-10-70"



"HR-1" CASING HEAD

TETE DE REVETEMENT "HR-1"

CABEZA DE REVESTIMIENTO "HR-1"

CABEZA DE TUBERIA, TIPO "HX-10-75"

Se emplea con evitadores de explosión para perforar, introducir la tubería, colocar el obturador y rehabilitar pozos bajo presión. Provista de medios para la colocación del obturador. Presión de ensayo de 5000 libras.

CABEZA DE TUBERIA, TIPO "HX-10-70"

Se emplea con evitadores de explosión para perforar, introducir la tubería bajo presión en aquellos casos en que no hay necesidad de colocar un obturador. El soporte de herramienta en J de la "HX-10-75" puede emplearse en esta cabeza, en caso de que se haga necesario colocar un obturador. Presión de ensayo de 5000 libras.

CABEZA DE TUBERIA, TIPO "PX-23"

Presión de ensayo de 1500 libras. Suspende la tubería por medio de sujetadores. Prensaestopa arriba de los sujetadores.

CABEZA DE TUBERIA, TIPO "PX-75"

Presión de ensayo de 5000 libras. Un cierre anular metálico, que forma parte de la tapa, asegura una perfecta obturación en la ranura labrada a máquina en la parte superior del cuerpo. Sujetadores cementados bien largos, para evitar el aplastamiento del tubo. Un prensaestopa de tipo corriente arriba de los sujetadores.

CABEZA DE REVESTIMIENTO, TIPO "HZ"

Se emplea con evitadores de explosión para perforar y para introducir la tubería en presencia de presión. Diámetro interior del cuerpo igual al del revestimiento sobre el cual atornilla. Ningún anillo seccionado expuesto a llenarse de barro. La brida de fijación del evitador de explosión se asegura por pernos al cierre anular metálico de dimensión normal. Presión de ensayo de 6000 libras.

CABEZA DE TUBERIA TIPO "HY"

Se emplea con evitadores de explosión para perforar y extraer la tubería bajo presión. Prensaestopa auxiliar arriba del soporte de herramientas. Soporte de herramientas con rosca hembra para conexión con la cabeza de tubería o para colocar otra cabeza de tubería. Presión de ensayo de 5000 libras.

COMBINACION DE CABEZA DE TUBERIA Y DE REVESTIMIENTO, TIPO "HZP"

Permite la perforación y la colocación del revestimiento, a través de los evitadores de explosión. La sección interior se atornilla en el soporte de suspensión cónico metido en el cuerpo. Después de la perforación del pozo, el cuerpo de la cabeza de tubería se asegura por pernos a cierre anular metálico, en lugar de la brida de sujeción del evitador de explosión. La tubería se suspende de la misma manera que el revestimiento en la cabeza del revestimiento. Bridas en todas las conexiones. Conexión a estilo "árbol ramificado" y orificios de salida de cabeza de tubería, a solicitud. Presión de ensayo de 6000 libras.

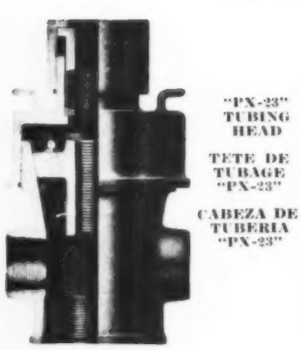
CABEZA DE REVESTIMIENTO, MODELO LUISIANA

El collar de la sección interior reposa encima del casquillo seccionado, comprimiendo la empaquetadura en el prensaestopa, para efectuar un cierre hermético. Presión de ensayo de 4000 libras.

"HZP" COMBINATION

COMBINAISON "HZP"

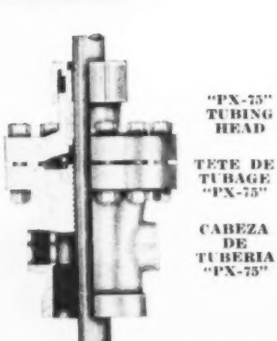
COMBINACION "HZP"



"PX-23" TUBING HEAD

TETE DE TUBAGE "PX-23"

CABEZA DE TUBERIA "PX-23"



"PX-75" TUBING HEAD

TETE DE TUBAGE "PX-75"

CABEZA DE TUBERIA "PX-75"

LOUISIANA PATTERN CASING HEAD

TETE DE REVETEMENT MODELE LOUISIANE

CABEZA DE REVESTIMIENTO, MODELO LUISIANA

Dreadnaught Products Are Manufactured By

BEAUMONT IRON WORKS COMPANY

BEAUMONT, TEXAS, U.S.A.

Export Distributor:

FRICK-REID SUPPLY CORPORATION

R.C.A. BLDG., NO. 30 ROCKEFELLER PLAZA, NEW YORK CITY

Fig. 511

Fig. 516

Fig. 505

Fig. 517

SPANG

CABLE TOOLS

SPANG AND COMPANY
Butler, Pa., U. S. A.

Fig. 526 Fig. 618 Fig. 654 Fig. 671 Fig. 693 Fig. 677 Fig. 683 Fig. 620 Fig. 706 Fig. 626 Fig. 524

Fig. 511—Spang Weldless Drilling and Fishing Jars . . . forged from one piece of alloy steel.
Fig. 505—Prosser Type Swivel Rope Socket.
Fig. 526—Standard Type Straight Blade All-Steel Drilling Bit, with heat-treated Pins.
Fig. 524—Spang Type Drilling Bit, Twisted Blade . . . most effective drilling bit available, for all formations. Insures straighter holes, lessens caving.
Fig. 618—Spang Patented Alligator Grab.
Fig. 654—Manila Rope or Wire Line Grab, made with either 2 or 3 prongs.
Fig. 671—Spang Eclipse Up-cutting Wire line Knife.
Fig. 693—Trip Casing Spear . . . made in 2, 3 and 4 Slip Types.
Fig. 677—Improved Type Casing Cutter.
Fig. 683—Spang Patented Reversible Splitter or Ripper.
Fig. 620—Combination Socket.
Fig. 706—Combination Trap Slip Socket, for fishing tubing and rods.
Fig. 626—Full Circle Three Slip Socket.
Fig. 516 & 517—Heat Treated Pin and Box for Stems and Sinkers.

For more than 40 years, Spang Drilling and Fishing Tools have been universally recognized as "Higher Standard" Cable Tools. Their reliability and economy have been proved in the drilling of thousands of the most difficult wells. Today, Spang and Company are the largest exclusive manufacturers of Cable Tools in the world. ● The Spang line includes the various tools required for all Cable drilling conditions and for general lease maintenance. Catalogue on request.

Fig. 511—Bacs sans soudure Spang de forage et de pêchage . . . forgés à partir d'acier spécial d'une seule pièce.
Fig. 505—Emerillon de câble Type Prosser.
Fig. 526—Trépan de forage tout acier de type standard à lame droite, avec tétons traités thermiquement.
Fig. 524—Trépan de forage du type Spang, à lame en spirale . . . le trépan de forage le plus efficace sur le marché, pour toutes les formations. Assure des trous plus rectilignes et réduit les éboulements.
Fig. 618—Crochet grappin Alligator Spang breveté.
Fig. 654—Crochet grappin sur câble métallique ou de Manille, avec 2 ou 3 branches.
Fig. 671—Couteau Eclipse Spang à taillage de bas en haut sur câble métallique.
Fig. 693—Harpon de revêtement à déclenchement . . . prévu en types à 2, 3 et 4 fourreaux.
Fig. 677—Fraise de revêtement de type perfectionné.
Fig. 683—Sectionneur ou fendeur réversible Spang, breveté.
Fig. 620—Douille combinaison.
Fig. 706—Douille-fourreau combinaison à trappe, pour le pêchage de tubage et de tiges.
Fig. 626—Douille à trois fourreaux de cercle complet.
Fig. 516 & 517—Goupille et coussinet traités thermiquement pour tige et dispositifs enfonceurs.

Depuis plus de 40 ans, les outils Spang de forage et de pêchage sont reconnus universellement comme les outils sur câble de "qualité supérieur". Ils ont fait leurs preuves, pour la régularité et l'économie, dans le forage de milliers de puits offrant des difficultés spéciales. A l'heure actuelle, la Spang and Company est le plus important fabricant spécialisé du monde en outils au câble. La série Spang comprend les divers outils répondant aux conditions les plus variées de forage à commande par câble et d'entretien général d'exploitations. Catalogue sur demande.

Fig. 511—Recipientes sin soldadura Spang de perforación y de pesca, forjados de especial aleación de acero de una sola pieza.
Fig. 505—Manguito de cable giratorio, tipo Prosser.
Fig. 526—Barrena de perforación de tipo Spang, de lámina recta normal, con espigas tratadas termicamente.
Fig. 524—Barrena de perforación de tipo Spang, de lámina en espiral. La broca o barrena más eficaz en el mercado, para todas las formaciones. Asegura agujeros más rectos y reduce los hundimientos.
Fig. 618—Atrapador Alligator Spang patentado.
Fig. 654—Atrapador en cable metálico o de Manila, con 2 o con 3 puntas.
Fig. 671—Cuchilla Eclipse Spang para cortar cable metálico de abajo para rriba.
Fig. 693—Harpón de disparo de revestimiento, provisto en tipos de 2, 3 o 4 sujetadores.
Fig. 677—Fresa de revestimiento de tipo perfeccionado.
Fig. 683—Seccionador o rompedor reversible Spang patentado.
Fig. 620—Manguito de combinación.
Fig. 706—Manguito de combinación de sujetador y trampa, para pesar la tubería y varillaje.
Fig. 626—Manguito de tres sujetadores a círculo completo.
Fig. 516 y 517—Espiga y cojinete tratados térmicamente para vástago y dispositivos forzadores.

Desde hace más de 40 años, las herramientas Spang de perforación y pesca se conocen universalmente como las herramientas de cable "de norma superior". Han demostrado su eficacia, en seguridad y en economía, en la perforación de millares de pozos de difícil tratamiento. Hoy día, la Spang & Company es la fábrica exclusiva más grande del mundo de herramientas de cable. El surtido Spang comprende todas las herramientas que se requieren para las condiciones más variadas de perforación por cable y de mantenimiento general de explotaciones. Catálogo a solicitud.

MISSION

Speak

IN EVERY OIL MAN'S

NOUVEAUX FOURREAUX ROTATIFS MISSION

LE PRINCIPLE UNIQUE "MISSION" AVEC "TOCS ROULANTS" assure un serrage élastique graduel. Ne risquent pas de couper, de mater ou de coincer le tuyau. Eliminent les opérations fastidieuses, aléatoires et onéreuses de repêchage par suite de tuyau endommagé.

La principale cause de retard dans la manutention des tuyaux, à savoir le coincement dans le bol, se trouve définitivement éliminé. Les tocs se libèrent du tuyau par roulement lorsqu'on tire sur celui-ci, ce qui assure un déclenchement instantané. *La rapidité de manutention des tuyaux économise.*

INSTALLATION RAPIDE SUR LE PLANCHER DE GRUE de nouveaux tocs et autres pièces usées, ce qui assure aux anciens fourreaux un rendement et une économie comparables à ceux de fourreaux neufs.

MANIEMENT PLUS SIMPLE ET PLUS RAPIDE. Economie de main-d'oeuvre et élimination d'accidents onéreux.

D'UN EMPLOI QUASI-GENERAL SUR TOUS LES PUITS FORÉS A PLUS DE 8.000 PIEDS DANS LES CHANTIERS DU CENTRE ET DU GOLFE DU MEXIQUE. PREFERENCE DE L'ELITE DES EXPLOITANTS DANS LE MONDE ENTIER.

PISTONS PERFECTIONNÈS DE POMPES A BOUES MISSION

FRAIS D'ENTRETIEN REDUITS DE MOITIÉ

Caoutchoucs remplaçables sur un corps extra-durable. Remplaçable sur le plancher de grue sans devoir séparer le piston de la tige.

ACIER NICKEL-CHROME ESTAMPÉ . . . CONSTRUCTION D'UNE SEULE PIECE. Résiste à toute pression. Tracé adapté à tige conique qui évite les échancrures autour du piston et de la tige, d'où économie sur les tiges et pistons. On peut rénover le piston économiquement.

SURFACE DE GLISSEMENT TROIS FOIS PLUS GRANDE . . . supprimant la mise en dérivation et assurant une progression à l'heure plus forte.

RECORDS D'ECONOMIE DANS TOUS LES PAYS PETROLIERS DU MONDE.

NUEVOS SUGETADORES ROTATIVOS MISSION

EL PRINCIPIO EXCLUSIVO "MISSION" DE FIADORES RODANTES asegura un cierre gradual amortiguado. Positivamente no hay peligro de cortar, dañar o aplastar el tubo. Evitan el trabajo fastidioso, prolongado y costososo de pescar los tubos dañados.

La principal causa de retardo en el manejo de tubería es su atascamiento en la concavidad, cosa que se elimina del todo. Los fiadores se desprenden del tubo por rodadura, mientras se tiran de éste, lo que asegura una soltura instantánea. *La rápida instalación de la tubería economiza tiempo y dinero.*

LA INSTALACION RAPIDA SOBRE EL PISO DE LA GRUA de nuevos fiadores y otras piezas desgastadas, asegura a los sujetadores viejos un rendimiento y una economía comparables a los de los sujetadores nuevos.

MANEJO MAS SENCILLO Y MAS FACIL. Economía en trabajo manual y eliminación de accidentes costosos.

SE EMPLEAN EN CASI TODOS LOS POZOS PERFORADOS A MAS DE 8.000 PIES DE PROFUNDIDAD, EN LOS YACIMIENTOS DEL CENTRO Y DEL GOLFO DE MEXICO DE LOS ESTADOS UNIDOS. SON LA PREFERENCIA DE LOS PRINCIPALES EXPLOTADORES DE PETROLEO DEL MUNDO ENTERO.

EMBOLOS PERFECCIONADOS DE BOMBAS DE BARRO MISSION

GASTOS DE CONSERVACION REDUCIDOS A LA MITAD

Piezas de caucho reemplazables, en un cuerpo de gran duración. Reemplazables sobre el mismo piso de la grúa, sin tener que separar el émbolo de su vástago.

ALEACION DE ACERO AL NIQUEL Y CROMO FORJADA A MARTINETE . . CONSTRUCCION DE UNA SOLA PIEZA. Resistentes a toda presión. Proyectados para ajustar en vástagos cónicos, para evitar toda irregularidad alrededor del émbolo y del vástago, asegurando un gran economía en estas importantes piezas. El émbolo puede reemplazarse a poco costo.

SUPERFICIE DE DESLIZAMIENTO TRES VECES MAS GRANDE . . . lo que elimina la acción en derivación, asegurando un mayor rendimiento por hora.

ESTAN ESTABLECIMIENTO PRECEDENTES EN ECONOMIA EN TODOS LOS PAISES PETROLEROS DEL MUNDO.

NEW MISSION ROTARY SLIPS

THE UNIQUE MISSION PRINCIPLE OF "ROLLING DOGS" gives a gradual cushioning grip. Positively will not cut, mar, or bottleneck the pipe. Insurance against many long-drawn-out, hazardous and costly fishing jobs due to damaged pipe.

The greatest cause of delay in handling pipe, namely, sticking in bowl, is positively eliminated. The dogs roll away from the pipe as it is pulled, assuring instant release. *Fast handling of pipe saves money.*

QUICK INSTALLATION ON THE DERRICK FLOOR of new dogs and other worn parts, puts old slips on a par with new slips, in efficient, economical performance.

EASIER AND FASTER TO HANDLE. Saves crews and costly accidents.

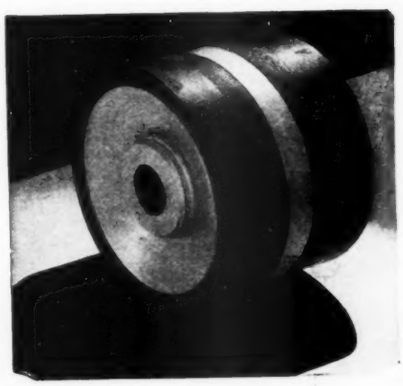
USED PRACTICALLY 100% ON ALL WELLS DRILLED BELOW 8,000 FEET IN THE MID-CONTINENT AND GULF COAST FIELDS. FIRST CHOICE OF LEADING OPERATORS THE WORLD OVER.

IMPROVED MISSION SLUSH PUMP PISTONS

CUT UPKEEP COSTS IN HALF

Replaceable rubbers on a long-lasting body. Replaceable on the derrick floor without removing piston from rod.

DROP FORGED CHROME NICKEL STEEL. . . . . ONE PIECE CONSTRUCTION. Resists any pressure. Designed to fit on tapered rod which prevents cut-outs around piston and rod, saving rod and piston costs. Piston can be reworked economically.



THREE-TIMES-GREATER WIPING SURFACE . . . eliminates by-passing, assuring more footage per hour.

MAKING ECONOMY RECORDS IN EVERY OIL COUNTRY THE WORLD OVER.

MISSION MANUFACTURING CO.

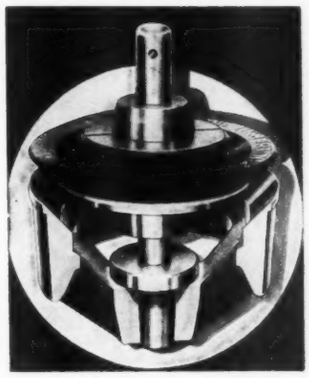
HUMBLE ROAD...HOUSTON, TEXAS, U.S.A.

PRODUCTS

Economy Language

NEW MISSION SILVER TOP SLUSH PUMP VALVES

LAST 100% LONGER



A removable bushing takes the blows instead of the seat.
SAVES MONEY formerly invested in continuously buying new seats for conventional type valves.
SAVES LABOR of changing seats often.
New bushing is tapered, a progressive Mission improvement that holds the bushing firmly in place eliminating wear on bottom of bushing and valve seat under the bushing. The bushing is easily changed by using attachment on Mission Seat Puller.
THE TIME PROVEN MISSION PRINCIPLE OF WEAR-TAKING REMOVABLE BUSHINGS IN A LONG-LASTING SEAT IS HELPING LEADING OPERATORS IN EVERY OIL COUNTRY TO GREATLY REDUCE PUMP UPKEEP COSTS.

New MISSION VALVELESS SWABS

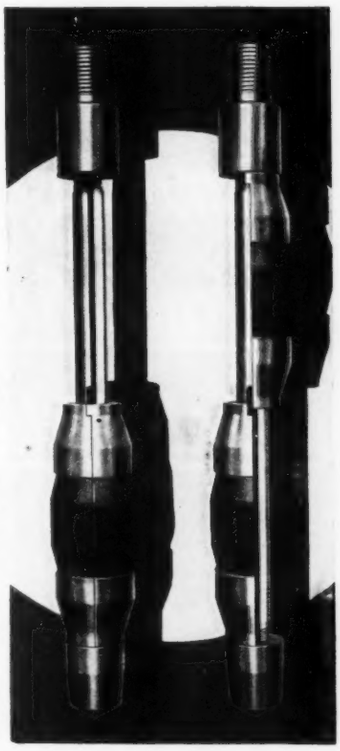
Fastest Falling Swab on the Market

Often when other swabs will not go in the hole, the Mission Valveless Swab falls like a plummet. This fast falling in difficult swabbing jobs is possible because the split-rubber, shown in the illustration, allows free by-pass for gas; and often permits Mission Swabs to pass through paraffin that stops other swabs.

SAFEST SWAB TO OPERATE. The Mission Swab will not blow out of the hole when pulling load as gas pressure will open split-rubber, permitting gas to by-pass, resuming its load without loss after gas has passed.

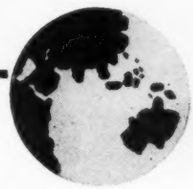
Swab will not rise faster than can be spooled. No loose lines over derrick floor to catch crews' arms or limbs.

SAVING TIME, MONEY, AND TROUBLE IN DIFFICULT SWABBING JOBS FOR NUMEROUS MAJOR OPERATORS.



MISSION MANUFACTURING CO.

HUMBLE ROAD...HOUSTON, TEXAS, U.S.A.



NOUVELLES SOUPAPES DE POMPES A BOUES MISSION A DESSUS EN ARGENT DUREE D'EMPLOI DOUBLE

Un coussinet démontable prend les chocs à la place du siège. ECONOMISE L'ARGENT dépensée auparavant dans l'achat répété de nouveaux sièges pour les soupapes du type classique. ECONOMISE LA MAIN-D'OEUVRE nécessaire pour changer fréquement les sièges. Le nouveau coussinet est conique, un perfectionnement progressif de Mission, de sorte que le coussinet se tient solidement en place, supprimant l'usure à la base du coussinet et du siège de soupape sous le coussinet. Le remplacement du coussinet se fait facilement en employant l'accessoire prévu à cet effet sur l'arrache-sièges Mission.

LE PRINCIPE MISSION BIEN ETABLI, CONSISTANT DE COUSSINETS AMOVIBLES S'USANT DANS UN SIEGE TRES DURABLE, AIDE L'ELITE DES EXPLOITANTS DANS TOUS LES PAYS PETROLIERS DU MONDE A REDUIRE FORTEMENT LEURS FRAIS D'ENTRETIEN DE POMPES.

NOUVEAUX ECOUVILLONS SANS SOUPAPE MISSION

L'écouvillon de la chute la plus rapide sur le marché

Très souvent, dans les cas où d'autres écouvillons refusent de tomber dans le puits, l'écouvillon sans soupape Mission tombe comme un plomb. Cette chute rapide dans les cas d'opération difficile d'écouvillonnage est possible grâce à ce que le caoutchouc fendu, représenté sur la gravure, permet le passage libre en dérivation du gaz, et souvent permet aux écouvillons Mission de passer à travers de la paraffine qui arrête d'autres écouvillons.

L'ECOUVILLON LE PLUS SUR A MANIER. L'écouvillon Mission ne risque pas d'être projeté hors du puits lorsqu'on tire la charge, car la pression des gaz ouvrira le caoutchouc fendu, permettant au gaz de passer en dérivation, rétablissant la charge sans aucune perte une fois les gaz passés.

L'écouvillon ne montera pas plus vite qu'on ne peut bobiner. Pas de câbles détendus au-dessus du plancher de grue pouvant accrocher bras ou jambes.

ECONOMIE DE TEMPS, D'ARGENT ET D'ENNUIS DANS LES ECOUVILLONNAGES DIFFICILES A DE NOMBREUX EXPLOITANTS PARMI L'ELITE.

NUEVAS VALVULAS MISSION SILVER TOP PARA BOMBAS DE BARRO

Un buje desmontable recibe los golpes, en lugar de recaer éstos sobre el asiento AHORRA EL DINERO que antes se gastaba en la compra repetida de nuevos asientos para las válvulas de tipo corriente.

AHORRA EL TRABAJO que se requiere para cambiar frecuentemente los asientos.

El nuevo buje es cónico, un perfeccionamiento notable ideado por la Mission. El buje o cojinete se mantiene firmemente en su sitio, suprimiendo el desgaste en su parte inferior y el desgaste del asiento de la válvula debajo del buje. El buje puede cambiarse con facilidad empleando el accesorio incluído para este fín en el extractor de asiento Mission.

EL PRINCIPIO MISSION BIEN ESTABLECIDO, QUE CONSISTE EN BUJES AMOVIBLES PARA RECIBIR EL DESGASTE DANDO PROTECCION AL ASIENTO EN QUE ESTAN MONTADOS, ESTA AYUDANDO A LOS PRINCIPALES EXPLOTADORES, EN TODOS LOS PAISES PETROLEROS DEL MUNDO, A REDUCIR MUCHO SUS GASTOS DE CONSERVACION DE BOMBAS.

NUEVOS ESCOBILLONES MISSION SIN VALVULA

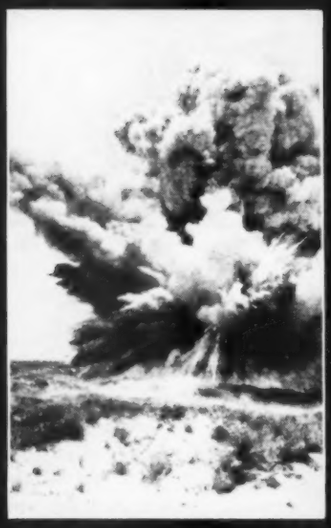
El escobillón de descenso más rápido del mercado

Muy a menudo, en el caso en que otros escobillones rehusan caer en los pozos, el escobillón Mission sin válvula cae como un plomo. Esta caída rápida, en los casos de difícil trabajo de escobillón, es posible debido a que la pieza de caucho seccionada, mostrada en el grabado, permite el pasaje libre en derivación del gas. Esto permite también, a menudo, que los escobillones Mission pasen a través de la parafina, que detiene a otros escobillones.

EL ESCOBILLON DE MANEJO MAS SEGURO. El escobillón Mission no está expuesto a ser desalojado violentamente afuera del pozo, mientras está tirando de la carga, pues la presión del gas abre la pieza de caucho seccionada, permitiendo el paso en derivación del gas, y restableciéndose la carga sin ninguna pérdida después de pasado el gas.

El escobillón no puede levantarse más rápido de lo que puede enrrollarse. No hay cables sueltos sobre el piso de la grúa, que puedan enrredar las piernas o los brazos de los operarios.

ECONOMIA DE TIEMPO, DE DINERO Y DE MOLESTIAS EN LOS MAS DIFICILES DE TRABAJOS DE ESCOBILLON EN BENEFICIO DE GRANDES FIRMAS EXPLOTADORAS DE POZOS PETROLIFEROS.



Eleven years seismograph work with no dissatisfied clients

Once años en trabajos seismográficos sin tener clients no satisfechos

Onze années d'opérations sismologiques sans un seul client mécontent

GEOPHYSICAL ENGINEERING CO.

SAN ANTONIO, TEXAS - U.S.A.

(Continued from Page 155)

plant is lower cost of moving equipment because of reduction in weight.

RECAPITULATION OF HEAT CONSERVATION

Item—	Fuel saving (per cent)	Water saving (per cent)
Feedwater heater	13	15
Superheater	10	15
Engine driven slush pump	30	30
Separate engine driven rotary	6	6
Boiler and steam line insulation (Av.)	15	15

Each item reflects the percentages of fuel and water used compared with a rig not using them.

To reduce the heat conservation to definite fuel savings it may be assumed an average rig uses 100 bbls. of fuel per day and calculate cumulatively the saving by adding the improvements to the present rigs.

Item—	Fuel saved (per cent)	Fuel used (bbls. per day)
Average rig (no improvements	0	100.0
Feedwater heater	13	87.0
Superheater	10	78.0
Engine driven slush pump	30	55.0
Engine driven rotary—steam saved 20 per cent over regular rig—30 per cent total steam to rig used by hoisting engine equals .20x.30	6	51.5
Boiler and steam line insulation	20	41.0

INTERNAL COMBUSTION ENGINES

Diesel engines are now commonly used for either direct drive through countershaft and clutch control, or direct connected to direct or alternating current generators for power plants for rotary rigs.

Oklahoma deep test

These power plants are especially adapted to locations where fuel and water are costly.

Portable outfits have been developed using gasoline engines for power units, capable of drilling a 6-inch rotary hole 4,000 feet. Ease of rigging up, tearing down and moving from one location to another has made such units popular and economical in many areas where it is desirable to drill tests.

The heavier diesel engine units are more gen-

(Continued on Page 174)

(Continué de Page 155)

dans le sous-sol des concessions de chaque exploitant. Par l'adoption de plus grands espacements entre les puits, les surfaces de drainage autour de chaque puits ne se gêneront pas entre elles et il ne se formera pas des sections manifestant des pressions de formation inègales de nature à faire fuir des gaz et des pétroles au-delà des limites des concessions, ce qui entraînerait des pertes pour le propriétaire légitime.

Les conditions précisées plus haut peuvent paraître très théoriques, mais aucune personne intéressée à l'extraction du pétrole ne peut nier qu'il ne soit désirable d'obtenir le plus haut rendement possible du gisement considéré avec un minimum de capitaux engagés et de frais de production. Vus les impôts croissants, il importe que les revenus de l'exploitation ne soient pas différés à longue échéance, et afin de pouvoir payer les impôts, c'est à ire à assurer des revenus à l'état intéressé et aux propriétaires du sol ainsi soulagés d'autres charges sous forme de taxes, l'application des méthodes modernes d'exploitation et de production pétrolières s'impose de plus en plus. Mais, cette nécessité demandera l'application des connaissances acquises par l'exploitation de tous genres de gisements pétroliers dans le passé; à la lumière de ces expériences, il faudra déterminer les pratiques néfastes du passé afin de les éliminer, puis appliquer systématiquement les méthodes plus rationnelles qui conviennent aux conditions générales du présent.

FORAGE A LA VAPEUR

Afin de faire face à la concurrence dans le domaine du forage rotatif, les fabricants de matériel à vapeur ont offert des chaudières et accessoires très perfectionnés. A cause de ses limitations en simplicité, en portabilité et en type de travail à effectuer, le groupe-force de l'appareillage de forage ne peut pas posséder tous les perfectionnements de détail du groupe-force fixe de haut rendement, mais il n'en reste pas moins vrai que les principes de base de ce dernier peuvent être appliqués ici aussi sans sacrifier la simplicité, la portabilité et les autres avantages de ce groupe.

Parmi les avantages principaux actuellement offerts sur les groupes-force à vapeur destinés au forage, on peut ci ter les réchauffeurs d'eau d'alimentation, le rendement de la chaudière, le surchauffage, l'organe moteur de pompe à dépôts, l'organe moteur rotatif, et, enfin, l'isolement de la chaudière et de la conduite de vapeur.

La grandeur de l'installation de chaudières a été réduite de trois à quatre chaudières de 125 chevaux à deux, et, dans un case, à une seule chaudière de 125 chevaux et d'une pression de 350 livres, et cela pour un trou de forage de 6.000 pieds. On a réussi à pousser la conservation de la chaleur à un point suffisant pour réduire la capacité de chaudière demandée par l'appareillage courant d'environ 50 pour cent. Un autre avantage qu'on doit à l'installation à vapeur moderne est la réduction des frais de transport du matériel par suite du poids moindre.

RECAPITULATION DE LA CONSERVATION DE LA CHALEUR

Article—	Economie de carburant (pourcentage)	Economie d'eau (pourcentage)
Réchauffeur d'eau d'alimentation	13	15
Surchauffeur	10	15
Pompe à dépôts mue par moteur	30	30
Rotatif séparé mu par moteur	6	6
Isolement de chaudière et conduite de vapeur (Av.)	15	15

Chaque article fait ressortir les pourcentages de carburant et d'eau employés en comparaison avec un appareillage qui ne les emploie pas.

(Continué sur Page 174)

(Continué de Página 155)

ción entre los pozos, las zonas de drenaje alrededor de cada pozo no presentan mutua interferencia. De esta manera no se establece desigual presión de formación, capaz de causar el desplazamiento del gas y petróleo más allá de los límites de la concesión, provocando una pérdida a su legítimo dueño.

Las condiciones anotadas más arriba podrán aparecer muy teóricas, pero ninguna persona interesada en la extracción de petróleo podría negar que semejante método es el más conveniente para obtener el más alto rendimiento posible del yacimiento, mediante una inversión mínima de capital y con gastos generales considerablemente limitados. En vista de los crecientes impuestos, es de suma importancia que las ganancias de la explotación no se dilaten o postergen por mucho tiempo. Y con el objeto de poder pagar los impuestos al estado, es decir, para asegurar una entrada al estado y a los propietarios del terreno, que no tienen que soportar semejantes impuestos sobre sus ingresos, se presenta como una necesidad imprescindible la introducción de perfeccionados métodos de explotación y producción. Pero esta necesidad exigirá la aplicación de los conocimientos adquiridos en la explotación de toto género de yacimientos petrolíferos del pasado, y en vista de estas experiencias, apartarse de las antiguas prácticas contraproducentes, adoptando en su lugar todas aquellas que mejor concuerden con las condiciones generales del presente.

PERFORACION A VAPOR

Para competir con la perforación rotatoria, los fabricantes de equipo de vapor han ofrecido calderas y accesorios notablemente perfeccionados, Debido a limitaciones en lo tocante a sencillez, portabilidad y tipo de trabajo por hacerse, el aparejo de perforación a vapor no puede incluir todos los refinamientos de las instalaciones fijas de alto rendimiento, pero los principios fundamentales de estas últimas pueden aplicársele sin sacrificar su sencillez, portabilidad y otras convenientes ventajas.

Entre las principales ventajas que se ofrecen ahora a instalaciones de vapor dedicadas al trabajo de perforación, se incluyen calentadores de agua de alimentación, calderas de elevado rendimiento, recalentamiento, motor de bomba de cieno, motor de máquina rotativa y aislamiento para calderas y tubería de vapor.

El tamaño de la plata de calderas de tres o cuatro calderas de 125 c. de f. a sólo dos, y en un caso, a una sola de 125 c. de f. y 350 libras de presión, para un pozo de 6.000 pies. Se ha alcanzado una suficiente conservación del calor para reducir la capacidad de la caldera en un 50% para el promedio de las instalaciones. Otra ventaja a favor de la moderna planta de vapor es el menor costo del equipo portátil, debido a su reducción en peso.

RECAPITULACION DE LA CONSERVACION DEL CALOR

Partidas—	Combustible ahorrado (porcentaje)	Agua ahorrada (porcentaje)
Calentador de agua de alimentación	13	15
Recalentador	10	15
Bomba de cieno accionada por motor	30	30
Máquina rotativa accionada por motor separado	6	6
Aislamiento de caldera y tubería de vapor (promedio)	15	15

Cada partida refleja los porcentajes de combustible y de agua usados, en comparación con una instalación que no los usa.

(Continué en Página 174)

BAKER

LA NORMA DEL MUNDO PARA LA SEGURA GUIA Y FLOTACION DE HILERAS DE REVESTIMIENTO DE CUALQUIERA LONGITUD. PROVEE EL MEDIO MAS SEGURO DE HACER UN PERFECTO TRABAJO DE CEMENTACION, Y LUEGO PUEDE SER PERFORADO FACILMENTE, DESMENUZANDOSE EN PEQUENOS E INOFENSIVOS FRAGMENTOS DE FACIL EXPULSION DEL AGUJERO.

STANDARD OF THE WORLD FOR SAFELY GUIDING AND FLOATING STRINGS OF CASING OF ANY LENGTH. PROVIDES THE MOST SUCCESSFUL MEANS OF SECURING PERFECT CEMENTING RESULTS, AND THEN IS EASILY DRILLED UP INTO SMALL, HARMLESS FRAGMENTS WHICH CIRCULATE OUT OF THE HOLE.

EN EL CATALOGO DE COMBINACION DAMOS DETALLES COMPLETOS

COMPLETE SPECIFICATIONS ARE IN THE COMPOSITE CATALOG

EQUIPO DE CEMENTAR BAKER

Para la guía, la flotación y cementación de revestimiento

La moderna práctica de flotar revestimiento en un pozo de poca o de gran profundidad se acepta hoy día como el método más seguro y económico. Sin embargo, la colocación y la cementación del revestimiento no constituyen una verdadera medida completa para apreciar el valor práctico del equipo de cementación y flotación. Todo dispositivo que venga a impedir o dificultar la adicional perforación y extracción de muestras no sólo pone en peligro la satisfactoria terminación del pozo, sino que puede también ser más tarde, causa directa de la anegación de agua y otras serias dificultades.

UD. PUEDE SACAR PROVECHO DE NUESTRA EXPERIENCIA

La Baker Oil Tools, Inc., una de las primeras del ramo, se ha dedicado con especialidad a la construcción de equipo para la colocación y cementación de revestimiento en pozos de petróleo, desde hace más de 25 años. Empezando con la Zapata de Revestimiento de Modelo Baker (descrita en otras página de este anuncio) procedimos luego a perfeccionar un equipo de flotación con válvula de hierro fundido, y más tarde, un surtido completo de equipo de cementación Baker, en el cual, el grupo de tapón y válvula se hace enteramente de hormigón de una fórmula exclusiva, y de baquelita especial.

Hoy día, todo el equipo de cementar Baker está completamente exento de metal en su construcción interior. Las zapatas guiadoras y otras piezas similares, llevan hormigón sólo en la parte interior de la zapata o collar de acero. Todas las unidades de "flotación" tienen un tapón de hormigón, con el grupo de válvula de contrapresión hecho de baquelita.

DETALLES DE LAS EXCLUSIVAS VENTAJAS DEL EQUIPO BAKER

Un tipo muy popular de equipo de cementar Baker es la Zapata Flotadora de Cemento Baker, cuya vista seccional mostramos arriba en la figura 1. El tapón y la guía ovalada en el fondo constituyen una masa de hormigón, firmemente anclada en ranuras fresadas en una zapata de revestimiento de acero sin costura. Un grupo de válvula de contrapresión, de baquelita, se halla anclado dentro del tapón de hormigón, y un agujero cilíndrico baja por el hormigón, entrando en la cámara de la válvula.

La bola de la válvula de baquelita tiene cierto peso específico, que le permite flotar en el barro o cieno ordinario de rotativa, o en el cemento empleado para la cementación del revestimiento. Un anillo de caucho se coloca en en una depresión del asiento de la válvula de baquelita, permitiéndose, de este modo, que la bola de baquelita tenga un asiento doble en el anillo de caucho, debajo del cual se halla el cuerpo de baquelita bien anclado en hormigón.

COMO Y POR QUE ESTA UD. SEGURO DE UN FUNCIONAMIENTO CORRECTO

Es evidente que cuando se empieza a bajar el revestimiento por el hoyo, la firme guía de hormigón pasará sin dificultad por toda leve irregularidad que se presente en la pared del hoyo. Esta guía de hormigón no puede trizarse o romperse mientras va conduciendo el revestimiento en su descenso por el pozo, y tampoco puede aplastarse o deformarse, al ser colocada en el fondo, a causa de que el hormigón de especial composición de que se hace, puede resistir dos veces más peso que el hormigón de tipo corriente.

Mientras el revestimiento se va bajando en el hoyo, la más leve presión ascendente, a través de la zapata flotadora de cemento Baker, hace que la bola de baquelita se levante instantáneamente, estableciendo un cierre hermético y positivo, por su contacto íntimo con el anillo de caucho. En este punto empieza la "flotación" del revestimiento. Debido a la construcción del tapón y la válvula interiores, y a la firmeza del hormigón y de la baquelita empleadas en la construcción, todo producto de "flotación" Baker posee suficiente fuerza para soportar y colocar el revestimiento, sin

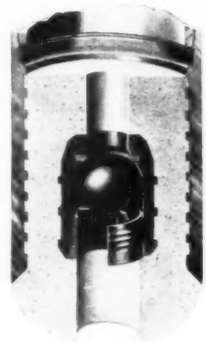


Fig. 1

Fig. 2

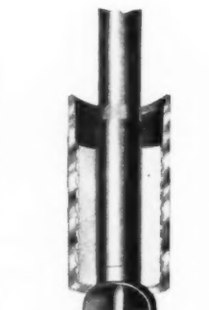


Fig. 3

Fig. 4

BAKER CEMENT EQUIPMENT

For Guiding, Floating and Cementing Casing

The modern practice of floating casing in a well, whether it is shallow or deep, is acknowledged to be the safe and economical method to use. However, the landing and cementing of the casing is not the true full measure by which cementing and floating equipment should be judged. Any device which will interfere with further drilling and coring operations not only endangers the successful completion of the well, but may be the cause of future water encroachments and other serious troubles.

YOU CAN PROFIT THROUGH OUR EXPERIENCE

Baker Oil Tools, Inc., have pioneered and specialized for more than 25 years in equipment for landing and cementing casing in oil wells. Starting with the Baker Pattern Casing Shoe (described on a following page in this section), we then developed floating equipment with a cast-iron valve, and later the complete line of Baker Cement Equipment in which the entire plug and valve assembly is made exclusively from concrete of a proved special formula, and special Bakelite.

Today all Baker Cement Equipment is entirely free from metal of any kind in its internal construction. Guide Shoes, and similar products, have concrete only inside the steel shoe or collar. All "floating" units have a plug made of concrete, with the back-pressure valve assembly made of Bakelite.

DETAILS OF EXCLUSIVE BAKER ADVANTAGES

A widely used type of Baker Cement Equipment is the Baker Cement Float Shoe, a sectional view of which is shown above in Figure 1. The plug and the rounded guide at the bottom are one mass of concrete which is securely anchored in grooves machined in a seamless steel casing shoe. A Bakelite back-pressure valve assembly is anchored inside of the concrete plug, and a cylindrical hole leads down through the concrete into the valve chamber.

The Bakelite Valve Ball is made with a specific gravity which permits it to float in ordinary rotary mud or in the cement used for cementing casing. A rubber ring is placed in a recess in the Bakelite valve seat, thus permitting the Bakelite ball to form a double-seal against rubber behind which is Bakelite anchored in concrete.

HOW AND WHY YOU ARE SURE OF SUCCESSFUL PERFORMANCE

It is evident that when the casing is started down the hole, the strong concrete guide will safely pass any slight irregularities in the wall of the hole. This concrete guide will not shatter or fracture while guiding casing down the well, and it will not crush when set on bottom, because the specially mixed concrete from which it is made will withstand more than two times as much weight as the ordinary construction concrete.

As the casing is lowered in the hole, the smallest amount of pressure upward through the Baker Cement Float Shoe will instantly cause the Bakelite Ball to move upward, where it provides a positive, leak-proof seal, against the rubber ring, and "floating" of the casing has commenced. Due to the design of the internal plug and valve, and the strong concrete and Bakelite used in construction, any Baker "Floating" Product possesses sufficient strength to safely land casing, regardless of the length of the string. In fact, with but few exceptions any Baker Cement Float Shoe or Float Collar will withstand pressures which would collapse the casing, and no experienced operator would even closely approach this collapsing point.

CEMENTING EFFICIENCY

When pump pressure is applied, the ample circulation area through the valve assembly insures unrestricted passage of the cement, but the fluid passageways are not too large for an effective washing action which is very desirable when heavy mud or cavings are present in the well.

After all desired cement has passed through the shoe and upward around the outside of the casing, pump pressure is relieved and the Bakelite Ball instantly moves upward against the rubber ring where a positive leakproof seal is formed against

FIRMEZA para la segura colocación de cualquier hilera de revestimiento.
RENDIMIENTO DE VALVULA para la flotación y distribución del cemento y su sujeción en su sitio.
FRIABILIDAD para seguridad en futura perforación y extracción de muestras.

STRENGTH for safely landing any string of casing.
VALVE EFFICIENCY for floating and for distributing the cement and holding it in place.
DRILLABILITY for safety of future drilling and coring.

LAS HERRAMIENTAS BAKER SE ACEPTAN POR TODOS LOS MODERNOS EXPLOTADORES DE PETROLEO COMO LAS MAS PRACTICAS Y SEGURAS

BAKER OIL TOOLS ARE ACCEPTED BY ALL MODERN OIL MEN AS COMPLETELY PRACTICAL AND DEPENDABLE

consideración de la longitud de la hilera. En efecto, con sólo pocas excepciones, cualquiera zapata flotadora o collar de flotación Baker puede resistir presiones que desalojarían el revestimiento, y ningún explotador de experiencia podría aproximarse a este punto peligroso.

EFICACIA EN LA CEMENTACION

Cuando se aplica la presión de la bomba, la amplia área de circulación por el grupo de la válvula asegura expedito paso al cemento, pero los conductos de líquido no son demasiado grandes para una efectiva acción de lavado, la cual resulta muy conveniente cuando hay barro espeso y hundimientos en el pozo.

Después de que toda la cantidad deseada de cemento ha pasado por la zapata y subido alrededor de la parte exterior del revestimiento, se suspende la presión de la bomba y la bola de baquelita se levanta instantáneamente contra el anillo de caucho, formándose aquí un positivo cierre hermético al escape, contra la baja o alta presión invertida. Todo el cemento que ha pasado por la zapata queda sin perturbación en su posición alrededor del revestimiento, lo que es una condición muy conveniente.

OPERACIONES FUTURAS SEGURAS

A continuación del endurecimiento del cemento, es fácil quitar perforando el tapón interior y válvula, con el tipo de barrena que se desee emplear, y esta barrena no pierde su filo, como sucede al tratarse de perforar metal. No hay pérdida de tiempo, pues la barrena procede a perforar un agujero de diámetro completo máximo, sin el peligro de que alguna pieza de metal pueda desviar la barrena, provocando la perforación de un agujero que no sea vertical.

Cuando se desee sacar muestras inmediatamente debajo de la zapata, no hay metal u otros materiales peligrosos, depositados al fondo, que hagan imposible o muy difícil este trabajo.

Esta conveniente condición se debe a la extrema friabilidad del hormigón y baquelita, materiales que pueden ser perforados con facilidad y que en partículas inofensivas salen del pozo conjuntamente con el barro de la rotativa. El hormigón que se emplea en todos los productos de cemento Baker es el resultado de años de estudios de laboratorio y de ensayos prácticos. A pesar de que posee gran firmeza y resistencia a la presión, es muy friable o desmenuzable, pudiendo reducirse fácilmente a partículas muy pequeñas bajo la acción de la barrena perforadora.

La vista seccional muestra cómo las piezas de baquelita se anclan en el tapón de hormigón, de modo que sólo se presenta una pequeña sección transversal a la barrena de perforación. La baquelita no se corta en piezas grandes, sino que se desmenuza también como el hormigón, como se ve en la figura 3.

EL PRODUCTO BAKER ASEGURA UN RENDIMIENTO COMPENSADO

En vista de los detalles anotados arriba, es evidente que hay tres rasgos esenciales que considerar al tratarse de equipo para guiar, flotar y cementar revestimientos en un pozo de petróleo. Estos son: firmeza, cosa que el equipo de cementación Baker tiene en abundancia; pero, la firmeza sola no es suficiente. Es necesario que exista también eficacia de válvula, lo que el Baker provee también con una cámara de válvula perfilada y una bola de flotación de baquelita, la cual instantáneamente forma un cierre doble contra las bajas y las altas presiones contrarias o invertidas. Sin embargo, estas dos características no son todavía suficientes para asegurar resultados permanentes durante la vida del pozo.

Cuando el revestimiento ha sido colocado y cementado con algún equipo en que se emplee metal para la construcción del tapón interior y válvula se establece entonces un peligro que no se prevee al principio. ¿Podrá el golpeteo y la contínua acción vibratoria de la barrena perforadora, tan necesaria para separar semejante metal de la zapata, resultar en romper el nuevo cemento afuera del revestimiento, permitiendo que por las trizaduras entre agua en el cemento? ¿Se podrá triturar bien el metal para que resulte posible sacar

Fig. 5

Fig. 6

Fig. 7

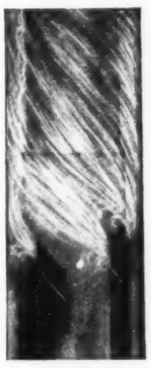


Fig. 8

Fig. 9

either low or high reverse pressure. All cement which has passed through the shoe remains undisturbed in its position around the casing, a condition which is very desirable.

SAFE FUTURE OPERATIONS

After the cement has set it is easy to drill out the internal plug and valve with the type of bit desired for drilling, and such bit is not dulled as is true when metal must be broken up. No time is lost, and the sharp bit proceeds to drill the maximum amount of full-gauge hole with no danger that a piece of metal will deflect the bit and start a hole which is not vertical.

Or if you desire to take cores immediately below the shoe, there are no dangerous metal or other materials left on the bottom to make coring either impossible or difficult.

This desirable condition is due to the extreme friability of the concrete and Bakelite, which are readily drilled up into small, harmless particles and circulated out of the well with the rotary mud. The concrete used in all Baker Cement Equipment is the result of years of research in both laboratory and field, and while it possesses great strength and resistance to pressure, it is very friable and easily reduced to small particles by a drilling bit.

The sectional view shows how all Bakelite is anchored in the concrete plug so that only a small cross section is presented to the drilling bit. The Bakelite is not broken out in large pieces, but is ground up with the concrete, as illustrated by Figure 3.

BAKER PROVIDES BALANCED EFFICIENCY

It is apparent from the details given above that there are three necessary features which must be contained in equipment for Guiding, Floating and Cementing casing in your oil well. These are Strength, which Baker Cement Equipment always provides, but Strength alone is not enough. You must also have Valve Efficiency which Baker provides with a streamlined valve chamber, and a floating Bakelite ball which instantly forms a double-seal against either low or high reverse pressure. But even these two are not enough for permanent results during the life of the well.

If your casing has been landed and cemented in place with any equipment in which metal is used for construction of the internal plug and valve, an unseen danger confronts you. Will the pounding and continued grinding vibrating action of the bit, necessary to break such metal out of the shoe, result in fracturing of the new cement outside of the casing and permit water to enter through cracks in the cement? Will you be able to grind up the metal sufficiently so that you can take cores immediately below the shoe? Will there be any pieces of metal remaining to deflect the drilling bit and start a crooked hole?

You can avoid these dangers by using Baker Cement Equipment, which contains the three vital features of Strength, Valve Efficiency and Drillability (complete friability)—and combines these three advantages in perfect balance.

A COMPLETE LINE FOR EVERY NEED

In addition to the Baker Cement Float Shoe shown in Figure 1 there are many other types of equipment for different classes of work. The Baker Cement Float Collar, shown in Figure 4, is popular with operators who desire to stop the plug used in cementing one or more joints above the bottom of the casing, thus retaining inside the casing the last of the cement to be pumped down the well, which is often mixed with fluid and is not of the desired consistency for good cementing. When this method is used a Baker Cement Guide Shoe is placed on the end of the casing, with the Baker Cement Float Collar one or two joints above it.

In very deep wells, or when every precaution is desired, a Baker Cement Float Collar is used as described above, and a Baker Cement Float Shoe is placed on the end of the casing. Two float valves are thus provided and maximum safety is secured.

BAKER CEMENT BAFFLE COLLAR WITH HOLE

This unit (See Figure 5) has no valve and is usually placed in the casing one or two joints above

A BAKER CEMENT FLOAT COLLAR WILL LAND YOUR CASING SAFELY AND THEN SERVE AS A STOP FOR THE CEMENTING PLUG TO RETAIN "TAILINGS" INSIDE THE CASING AND ALLOW ONLY CEMENT OF THE SPECIFIED MIXTURE TO BE PLACED ON THE OUTSIDE OF CASING. OTHER BAKER PRODUCTS PERMIT THE CEMENTING OF BLANK SECTIONS OF CASING AND CEMENTING AT INTERMEDIATE DEPTHS.

UN COLLAR DE FLOTACION DE CEMENTO BAKER PUEDE COLOCAR CON SEGURIDAD EL REVESTIMIENTO Y SERVIR LUEGO DE DETEN PARA EL TAPON DE CEMENTACION, PARA RETENER LAS PARTICULAS DENTRO DEL REVESTIMIENTO Y PERMITIR QUE SOLO CEMENTO DE MEZCLA ADECUADA PUEDA COLOCARSE EN EL EXTERIOR DEL REVESTIMIENTO. OTROS PRODUCTOS BAKER PERMITEN LA CEMENTACION DE SECCIONES DE REVESTIMIENTO SIN PROTECCION Y LA CEMENTACION A PROFUNDIDADES INTERMEDIARIAS.

LOS VISITANTES SIEMPRE SON BIENVENIDOS A NUESTRAS FABRICAS EN HOUSTON Y LOS ANGELES

VISITORS ARE ALWAYS WELCOME AT OUR PLANTS IN HOUSTON AND LOS ANGELES

BAKER

BAKER

LOS ORIFICIOS EN EL CASCO DE ACERO DIRIGEN EL CEMENTO HACIA ARRIBA CON UN MOVIMIENTO GIRATORIO. SE REDUCE LA POSIBILIDAD DE ACANALAR LA FORMACION Y EL CEMENTO ES COLOCADO ALREDEDOR DEL REVESTIMIENTO PARA ASEGURAR EL CIERRE DEL AGUA POR LA PARTE DE ARRIBA.

OUTLETS THROUGH THE STEEL SHELL DIRECT THE CEMENT UPWARD WITH A WHIRLING MOTION. POSSIBILITY OF CHANNELING THE FORMATION IS LESSENED AND CEMENT IS PLACED UP AROUND THE CASING TO INSURE SHUTTING OFF WATER FROM ABOVE.

LOS TRABAJOS ESPECIALES DE CEMENTACION SE HACEN CON FACILIDAD CON EL EQUIPO BAKER

SPECIAL CEMENTING WORK IS EASILY DONE WITH BAKER EQUIPMENT

muestras inmediatamente debajo de la zapata? ¿ Se presentarán algunas piezas metálicas que desvíen la barrena perforadora y empiezen entonces a provocar la perforación de un hoyo torcido?

Todos estos peligros se pueden evitar empleando el equipo de cementación Baker, el cual comprende los tres rasgos esenciales de firmeza, eficacia de válvula y friabilidad extrema, bajo la acción de la perforación, combinando estas tres grandes ventajas en perfecto equilibrio.

UN SURTIDO COMPLETO PARA TODO REQUISITO

Además de la zapata flotadora de cemento Baker mostrada en la figura 1, ofrecemos muchos otros tipos de equipo para diferentes clases de trabajo. El collar de flotación de cemento Baker, mostrado en la figura 4, es muy popular entre los explotadores que desean para el tapón empleado en la cementación de una o más juntas, arriba del fondo del revestimiento, reteniendo así dentro del revestimiento, la última porción del cemento que ha de bajarse por el pozo, y que a menudo está mezclado con líquido, resultando de inadecuada consistencia para una buena cementación. Cuando se emplea este método, se coloca una zapata guidora de cemento Baker en el extremo del revestimiento, con un collar de flotación de cemento Baker una o dos juntas arriba de ella.

En los pozos muy profundos, o cuando se requiere toda precaución posible, se emplea un collar de flotación de cemento Baker, tal como se ha descrito arriba, y se coloca también una zapata de flotación de cemento Baker en el extremo del revestimiento. Se provee así un par de válvulas de flotación, estableciéndose máxima seguridad.

COLLAR DEVISADOR CON AGUJERO BAKER DE CEMENTO

Esta unidad (véase la figura 5) no tiene válvula y se coloca generalmente en el revestimiento una o dos uniones arriba del fondo, donde sirve para el tapón de cementación, como se ha descrito ya en conexión con el collar de flotación. El collar desviador se hace de hormigón Baker especial y casi llena el espacio entre las roscas de arriba y del fondo, estableciendo así gran resistencia y firmeza al golpe. El agujero, a través del tapón de hormigón, es bastante largo para permitir el paso expedito del cemento.

El collar desviador de cemento Baker, tipo sólido (mostrado en la figura 6) se emplea con una conexión perforada (véase la figura 17) y con un collar de flotación de cemento Baker (figura 4) o en combinación con alguno de los grupos de joula, que se describen en las páginas siguientes.

ZAPATA DE TAPON DE REVESTIMIENTO SOLIDO BAKER DE CEMENTO

Este equipo (véase la figura 7) consta de un tapón sólido y guía, de hormigón Baker, moleados y anclados en una zapata sencilla de revestimiento. Su utilizacion se considera la mejor práctica cuando se instala revestimiento para hileras de petróleo, a causa de que el hormigón puede perforarse fácilmente y las partículas quitarse después, si se quiere, sin ningún inconveniente.

MODERNO EQUIPO "GIRATORIO" BAKER

Para los explotadores que desean lo mejor, o cuando las dificultades pudieran impedir el hacer un buen trabajo de cementación, siguiendo los métodos corrientes, se recomienda el quipo "Giratorio" de cementación Baker.

En toda la construcción interior se emplean hormigón Baker y baquelita. El tipo de la zapata de flotación giratoria de cemento Baker (figuras 9 y 10) es similar de la zapata de flotación de cemento Baker (figura 1), pero, en adición al agujero inferior de circulación, hay varias salidas laterales por la cámara de la válvula, debajo del asiento de la válvula, como se ve en la figura 10. Sobre estas salidas se colocan placas transversales, dispuestas en un ángulo en relación con la dirección del flujo, de modo que cuando el cemento sale por estas aberturas laterales, queda entonces dirigido hacia arriba, con un movimiento giratorio, que lo hace moverse alrededor del espacio anular entre el revestimiento y la pared del agujero.

Circulándolo antes de la cementación, el equipo giratorio Baker lava la formación y la prepara para que tenga mejor unión con el cemento que se le aplicará después. Sin embargo, no se causa daño alguno a la pared del agujero, a causa de que la fuerza de la circulación no se aplica nunca en una corriente directa, sino con un movimiento circular ascendente.

Cuando se empieza la cementación, estos orificios laterales hacen que toda la masa de cemento gire mientras asciende detrás del tubo, y todo el espacio anular entre el tubo y la formación se llena entonces de cemento. Como lo hemos dicho más arriba, el moviento giratorio no raspa o acanala la formación.

Por la figura 9 se ve claramente que al quedar el revestimiento en contacto con la formación, en un lado del hoyo, o aun al estar el revestimiento fijo al fondo, sin que por el agujero inferior de la zapata pueda salir el cemento, habrá entonces salida de cemento por los agujeros laterales, los cuales no están entonces tapados. El cemento será entonces dirigido hacia arriba, alrededor del tubo, llegando al punto en que debe colocarse.

OTROS TIPOS DE EQUIPO "GIRATORIO"

La zapata de flotación de tapón sólido de cemento Baker, de tipo giratorio, tiene una punta sólida, en la forma de una guía, que se extiende por debajo de la zapata, como se ve en la figura 11. Este tapón sólido sirve para dirigir todo el cemento por las salidas u orificios laterales. Esta zapata giratoria de tapón sólido se

Fig. 10

Fig. 11

Fig. 12

Fig. 13

Fig. 14

bottom, where it serves to stop the cementing plug, as just described for the Float Collar. The baffle, or plug, is made of Baker special concrete and practically fills the space between the top and bottom threads, thus providing great strength and resistance to impact. The hole through the concrete plug is large enough to permit free passage of the cement.

The Baker Cement Baffle Collar, Solid (shown in Figure 6) is used with a Perforated Nipple (see Figure 17) and a Baker Cement Float Collar (Figure 4) or in combination with some of the Basket Assemblies described on the following pages.

BAKER CEMENT BULL PLUG CASING SHOE

This equipment (see Figure 7) consists of a solid plug and guide made of Baker Concrete, cast and anchored in a Plain Casing Shoe. Its use is considered the best practice when running casing for oil strings, as the concrete is easily drilled up and circulated away if later desired.

BAKER MODERN "WHIRLING" EQUIPMENT

For those oil men who want the best, or when difficulties might prevent a good cementing job if performed by the usual methods, Baker Cement "Whirling" Equipment is recommended.

Baker Concrete and Bakelite are used for all internal construction. The design of the Baker Cement Whirler Float Shoe (Figures 9 and 10) is similar to the Baker Cement Float Shoe (Figure 1), but in addition to the bottom circulation hole a number of side outlets lead out from the valve chamber below the valve seat, as shown in Figure 10. Plates are set across the outlets, at an angle to the direction of flow, so that when the cement passes out through these side holes it is directed upward with a "whirling" motion and moves around the annular space between the casing and the wall of the hole.

By circulating before cementing, Baker Whirler Equipment washes the formation and prepares it for a better bond with the cement which is to follow. However, no damage is done to the wall of the hole, as the force of the circulation is never applied in a direct stream, but with an upward circular motion.

When cementing is commenced, these side outlets cause the entire mass of cement to whirl (see Figure 8) as it ascends behind the pipe, and the entire annular space between pipe and formation is filled with cement. As explained above, the whirling motion does not wash or cut channels into the formation.

It is clearly seen from Figure 9 that should the casing be in contact with the formation on one side of the hole, or even if the casing is set on bottom, and no cement can pass out the lower hole in the shoe, the side outlets which are not obstructed, will serve to direct the cement upward around the pipe, and place the cement in the desired position.

OTHER TYPES OF "WHIRLING" EQUIPMENT

The Baker Cement Whirler Bull Plug Float Shoe has a solid, guide-shaped nose which extends below the shoe; see Figure 11. This solid plug serves to divert all of the cement through the side outlets. The "Bull Plug" Whirler Shoe is recommended only when the hole has been carefully prepared for the introduction of casing, since the absence of the bottom circulating hole makes it impossible to "wash down" the casing should this become necessary.

However, when the hole has been properly prepared, this unit is very efficient since all fluid is forced out through the side outlets to wash the formation in advance of cementing, and later all cement is similarly diverted to whirl upward and completely surround the casing.

The Baker Cement Whirler Guide Shoe, shown in Figure 12, is constructed with the side outlets for "whirling" but has no valve for "floating" the casing. It serves as a strong, safe guide, and provides the efficient whirling advantages previously described.

BAKER WHIRLER CEMENTING COLLAR

This equipment provides an effective method of cementing at any desired depth in casing and is

EL METODO BAKER DE HACER "GIRAR" EL CEMENTO ALREDEDOR DE LA ZAPATA Y REVESTIMIENTO ES MUY EFICAZ, REPRESENTANDO UNA GARANTIA DE BUEN TRABAJO DE CEMENTACION

THE BAKER METHOD OF "WHIRLING" THE CEMENT UPWARD AROUND THE SHOE AND CASING IS VERY EFFICIENT AND IS YOUR BEST INSURANCE FOR SUCCESSFUL CEMENTING!

NUNCA SE EMPLEA PELIGROSO METAL EN LA CONSTRUCCION INTERNA DEL EQUIPO DE CEMENTACION BAKER. SOLO SE EMPLEAN AQUI HORMIGON Y BAQUELITA QUE PUEDEN FACILMENTE PERFORARSE Y DESALOJARSE POR LA CIRCULACION

NO DANGEROUS METAL EVER IS USED FOR THE INTERNAL CONSTRUCTION OF BAKER CEMENTING EQUIPMENT—ONLY CONCRETE AND BAKELITE WHICH ARE EASILY DRILLED UP AND CIRCULATED OUT OF THE HOLE

recomienda sólo para aquellos casos en que el agujero se ha preparado con cuidado para la introducción del revestimiento, a causa de que la ausencia de agujero de circulación de fondo hace imposible aplicar el cemento abajo del revestimiento, en caso de que haya necesidad de hacerlo.

Sin embargo, cuando se ha preparado bien el agujero, esta unidad resulta muy eficaz, a causa de que todo el líquido es obligado a salir por los orificios laterales, para lavar la formación antes de la cementación, y más tarde, todo el cemento es igualmente dirigido hacia arriba, con un movimiento giratorio, para que rodee por completo el revestimiento.

La zapata guiadora de cemento Baker, de tipo giratorio, mostrada en la figura 12, tiene los orificios laterales, para la acción giratoria, pero no tiene ninguna válvula para la flotación del revestimiento. Sirve de firme y segura guía y provee las eficaces ventajas giratorias que hemos ya descrito.

COLLAR DE CEMENTACION BAKER DE TIPO GIRATORIO

Este equipo provee un efectivo método de cementar el revestimiento a cualquier profundidad deseada y se adapta muy en particular a la cementación de una hilera cuya porción superior se aprovecha para el agua y cuya sección inferior se utiliza para el petróleo. Evita toda incertidumbre acerca de un trabajo de combinación y reduce las posibilidades de falla a un mínimo.

Como se ve en la figura 14, un tapón de hormigón Baker se ancla firmemente en un collar de acero especial sin costura, de más o menos 28 pulgadas de longitud. Se coloca un grupo de válvula Baker en posición normal, para la flotación y la cementación, cerca del extremo superior de este tapón de hormigón. Un similar grupo de válvula se coloca en posición invertida en el extremo inferior del tapón, conteniendo esta válvula una bola de baquelita contrapesada.

Cuando se aplica la presión de la bomba, la bola inferior de baquelita provee un cierre hermético al escape o desviador que impele al cemento a salir por los orificios laterales y subir alrededor del revestimiento.

Véase también la figura 13, que muestra una vista exterior de este equipo.

COLLAR DE FLOTACION DE CEMENTO BAKER, DE TIPO GIRATORIO, CON DESVIADOR INFERIOR SOLIDO O TAPON

Esta unidad se emplea en aquellos casos en que no hay necesidad de un grupo de doble válvula. Véase la figura 15. El desviador de hormigón sólido para el cemento y lo hace salir por los orificios del girador. El grupo de válvula es idéntico al de la zapata de flotación de cemento Baker, de tipo giratorio; véase la figura 1. Este equipo se emplea principalmente en conjunción con la combinación de conexión y jaula.

GRUPOS DE JAULAS BAKER

La firme jaula hidráulica de lona, mostrada en la figura 16, sirve como un obturador exterior durante los trabajos de cementación. Protege la formación de abajo contra la contaminación de cemento y hundimientos, y ayuda en el trabajo de cementación, evitando la disipación del cemento. Se hace de gruesa lona hidráulica, la cual está soportada por muchos resortes muy bien soldados en sus sitios. La jaula y los resortes no están sujetos a ninguna considerable tensión o carga, a causa de que el líquido que hay debajo soporta todo el peso o presión proveniente desde arriba. Abajo indicamos algunas de las más populares combinaciones de cementación permitidas por la jaula de lona.

Collar de cementación Baker, de tipo giratorio, con jaula (véase la figura 16). Consta del collar de cementación de tipo giratorio, mostrado en la figura 13 y de una jaula. Es muy eficaz para la cementación de hileras de combinación, particularmente cuando el tubo es cementado arriba de la arena petrolífera.

Combinación de cementación Baker de Conexión y jaula de lona con resortes (mostrada en la figura 17). Se emplea con frecuencia en conexión con el collar de cementación y el collar de flotación de cemento de tipo giratorio con desvuador sólido. Se emplea, también, mucho para hacer combinaciones con varios tipos de collares giratorios y collares desviadores de cemento Baker. Cuando se emplea con un collar desviador sólido, la conexión va perforada.

Combinación de cementación Baker de conexión perforada con jaula y desviador sólido. Comprende un desviador sólido de hormigón debajo de la conexión perforada y puede colocarse en una hilera de revestimiento en cualquier punto donde ha de cementarse. Se emplea también, a menudo, con un collar de flotación Baker de cemento, lo mismo que cuando se cementa bajo presión, mediante un retenedor de cemento Baker. Puede suministrarse con jaula alambrada en la conexión.

Combinación de conexión perforada con jaula de lona invertida y resortes. Se usa como la unidad superior cuando se emplea una combinación de doble jaula. Consta de una jaula de lona Baker soldada a una conexión perforada, con el extremo acampanado de la jaula unido por alambre a la conexión para facilitar la bajada por el pozo; véase la figura 18.

Combinación de doble jaula, con jaula invertida arriba y una conexión perforada con jaula y desviador sólido abajo. Es muy conveniente para la cementación entre formaciones, que han de protegerse contra la posible contaminación con cemento. Cuano se desea pasar un revestimiento o forro sin un desviador en el tubo, la unidad inferior puede ser entonces una combinación de cementación Baker con conexión perforada. En este caso, un tapón de puente de revestimiento Baker puede reemplazar el desviador sólido en el trabajo de cementación.

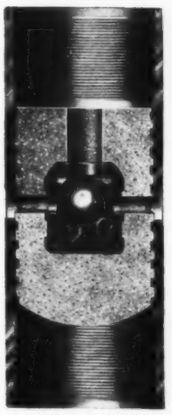


Fig. 15

Fig. 16

Fig. 17

Fig. 18

particularly adaptable for cementing a combination string where the upper portion is used as a water string and the lower portion as an oil string. It removes all previous uncertainty about a combination job and reduces the chances of failure to a minimum.

As shown in Figure 14, a Baker concrete plug is securely anchored in a special seamless steel collar approximately 28 inches in length. One Baker Valve Assembly is placed in normal position for floating and cementing near the top of this concrete plug. A similar valve assembly is placed in reversed position in the lower end of the plug, containing a "weighted" Bakelite ball.

When pump pressure is applied, the lower Bakelite ball provides a leakproof seal or baffle which forces the cement outward through the side outlets and upward around the casing. See also Figure 13 for exterior view of this equipment.

BAKER CEMENT WHIRLER FLOAT COLLAR WITH SOLID BOTTOM BAFFLE, OR PLUG

This unit is used where a double valve assembly is not considered necessary; see Figure 15. The solid concrete baffle stops the cement and forces it out through the whirler ports. The Valve Assembly is identical to that in the Baker Cement Whirler Float Shoe; see Figure 1. This equipment is used principally in conjunction with Cement Hook-up Nipple with Basket.

BAKER BASKET ASSEMBLIES

The heavy hydraulic Canvas Basket, shown in Figure 16, serves as an outside packer during cementing jobs. It protects the lower formation from cement contamination and from cavings of upper formation; and it aids in the cementing job by preventing any dissipation of the cement. It is made of heavy hydraulic canvas that is supported by many springs which are welded in position. The Basket and Springs are not subjected to any great amount of strain since the fluid below supports any weight or pressure that is applied from above. Some of the more widely used cementing hook-ups accomplished with the Canvas Basket are mentioned below.

The Baker Whirler Cementing Collar with Basket (see Figure 16) consists of the Whirler Cementing Collar shown in Figure 13, and a Basket. It is very efficient for cementing combination strings, especially when the pipe is cemented just above the oil sand.

The Baker Cement Hook-Up Nipple with Canvas Basket and Springs (shown in Figure 17) is most often used in connection with the Whirler Cementing Collar on the Cement Whirler Float Collar with Solid Baffle. It is also widely used, however, to make combinations with various types of Baker Whirler Collars and Cement Baffle Collars. When used with a Solid Baffle Collar, the nipple is perforated.

The Baker Perforated Cement Hook-Up Nipple with Basket and Solid Baffle includes a solid concrete baffle below the perforated nipple and can be placed in a string of casing at any point where cementing is to be performed. It is also often used in conjunction with a Baker Cement Float Collar; or when cementing under pressure through the Baker Cement Retainer. Can be furnished with Basket wired down to and through nipple.

The Baker Perforated Hook-Up Nipple with Inverted Canvas Basket and Springs is used as the upper unit when a Double Basket Hook-Up is used. It consists of a Baker Canvas Basket welded to a perforated nipple with the flared end of the Basket wired down to the nipple for ease in lowering down the well; see Figure 18.

The Double Basket Hook-Up with the Inverted Basket above and a Perforated Hook-Up Nipple with Basket and Solid Baffle below, is especially desirable for cementing between formations that must both be protected from possible contamination by cement. When it is desired to run casing or liner without a baffle in the pipe, the lower unit may be a Baker Cement Hook-Up Nipple with the nipple perforated. In this case, a Baker Casing Bridge Plug can replace the solid baffle for cementing purposes.

A CANVAS BASKET SUPPORTED BY STEEL SPRINGS SERVES AS AN OUTSIDE PACKER ON VARIOUS TYPES OF BAKER WHIRLING EQUIPMENT FOR SPECIAL CEMENTING APPLICATIONS. "BAFFLE" COLLARS ARE USED IN MANY COMBINATION CEMENTING JOBS TO SECURE RESULTS WITHOUT THE USE OF METAL PLATES OR METAL VALVES.

UNA JAULA DE LONA SOPORTADA POR RESORTES DE ACERO SIRVE COMO UN OBTURADOR EXTERIOR EN VARIOS TIPOS DE EQUIPO GIRATORIO BAKER, PARA ESPECIALES APLICACIONES DE CEMENTO. LOS COLLARES "DESVIADORES" SE EMPLEAN EN VARIAS COMBINACIONES DE CEMENTACION, PARA OBTENER BUENOS RESULTADOS, SIN USAR PLACAS O VALVULAS METALICAS.

EL GRAN CATALOGO GENERAL BAKER SE ENVIARA A TODO INTERESADO QUE LO PIDA

THE LARGE BAKER CATALOG WILL BE SENT TO ANY OIL MAN REQUESTING IT

BAKER

BAKER

ESTA EXCELENTE HERRAMIENTA PUEDE AGRANDAR UN HOYO DE PERFORACION A UN DIAMETRO MUCHO MAYOR QUE EL DIAMETRO DEL AGUJERO O REVESTIMIENTO POR DONDE ELLA PASA. SU FUNCIONAMIENTO ES SEGURO Y HACE MUCHOS TRABAJOS PRACTICOS MUY LUCRATIVOS. SUS MUCHOS ANOS DE SERVICIO COMPRUEBAN SU BUEN SERVICIO Y SEGURIDAD.

THIS SUCCESSFUL TOOL WILL ENLARGE A DRILLED HOLE TO A DIAMETER MUCH GREATER THAN THE DIAMETER OF THE HOLE OR CASING THROUGH WHICH IT IS RUN. IT IS SAFE TO USE, AND PERFORMS PROFITABLE WORK OF MANY KINDS. THOUSANDS OF RUNS HAVE PROVED IT IS ALWAYS PRACTICAL AND DEPENDABLE.

EN EL CATALOGO DE COMBINACION DAMOS INFORMACION ILUSTRADA
COMPLETE DETAILS AND ILLUSTRATIONS ARE IN THE COMPOSITE CATALOG

RASPADOR DE PARED GIRATORIO BAKER, TIPO HIDRAULICO DE EXPANSION

El raspador de pared giratorio Baker, de tipo hidráulico de expasión o extensión, representa un medio de agrandar un agujero abierto a un diámetro considerablemente mayor que el del revestimiento, o un agujero a través del cual pueda pasarse la herramienta. Este agrandamiento puede efectuarse en cualquier punto deseado. La seguridad de la construcción y funcionamiento, en combinación con la sorprendente capacidad de escariación de la herramienta, permite a este equipo hacer trabajos que hasta ahora se creian imposibles. Entre las aplicaciones más convenientes del raspador de pared Baker se hallan las siguientes: raspaje de la arena petrolífera del barro; agradamiento del agujero para la instalación de forros; colocación de tapones de cemento; obturación para trabajos de cementación; agrandamiento de agujeros para la colocación de revestimientos; perforación direccional; ladeamiento; enderezamiento de agujeros; trabajos de pesca; ensayos de obturación de agua.

COMBINA TODAS LAS VENTAJAS

El raspador de pared Baker de tipo hidráulico de expansión es el único escariador del mercado que combina todas las ventajas siguientes:

Máxima escala de expansión para las cuchillas cortantes, con expansion de 4″ a 29″, mediante el empleo de sólo seis cuerpos.

Los bordes cortantes de las cuchillas tienen contacto con el lado del agujero en una distancia suficiente para asegurar un buen soporte sobre la formación. Esta construcción evita toda tendencia a deformación de cuchillas, asegurando un corte uniforme en todos los lados del agujero. Permite también una alimentación descendente más rápida, lo que resulta en una acción cortante más rápida.

La fuerza completa de la circulación está dirigida a los bordes cortantes de las cuchillas. El material cortado se quita con facilidad y las cuchillas se mantienen bien enfriadas y lubricadas.

Puede adaptarse a sacar muestras de las paredes de un hoyo abierto sencillamente instalándoles cuchillas cortadoras de muestras, que se describen en otra página y se muestran en la figura 24. Este rasgo exclusivo es de gran importancia.

TIPO Y CONSTRUCCION

La herramienta consiste en un cuerpo de aleación acero, que contiene un émbolo al cual están conectadas dos cuchillas montadas de tal modo que se pliegan en el cuerpo durante la baja y la subida por el hoyo. Al momento que se quiera, el émbolo se hace descender por la aplicación de la presión de la bomba en la superficie, lo que produce la proyección de las cuchillas hacia afuera y hacia arriba, en el sentido de la formación, como se ve en la figura 20. Cuando empieza la rotación, estas cuchillas se extienden y cortan el agujero a la anchura máxima de su posición extendida y se mantienen en esta posición de corte por el mismo reborde que han cortado en la formación, como se ve en la figura 21. Cuando la formación es blanda, las cuchillas se sujetan en su posición extendida por la presión de la bomba. Amplios orificios de circulación dirigen el líquido sobre cada cuchilla, lubricando y enfriando la superficie cortante y alejando el material cortado de la formación.

La barrena guiadora, debajo de las cuchillas, queda dispuesta a escuadra con el plano de las cuchillas. Esta barrena guiadora entra en el pequeño agujero que queda adelante de las cuchillas, centrando así el raspador y dando estabilidad a la acción cortante de las cuchillas. Las cuchillas mismas tienen largos filos escariadores, que se ponen en contacto con la pared del agujero, estableciendo una buena superficie de contacto con la formación y evitando que la herramienta se ladee o tuerza. Por esta razón, existe la seguridad de que el raspador hidráulico de pared Baker sigue la dirección del agujero y corta a diámetro completo en todos los puntos.

AGRANDAMIENTO ANTES DE LA CEMENTACION

Una de las muchas maneras en que el raspador de pared Baker se utiliza ventajosamente es el agrandamiento del agujero' en una distancia de 20 a 40 pies al fondo del diámetro del pozo, como se ilustra en la figura 22. Esta práctica elimina la posibilidad de que la junta de zapata del revestimiento tenga contacto con la pared del pozo impidiendo su cementación a su alrededor completo.

Fig. 19

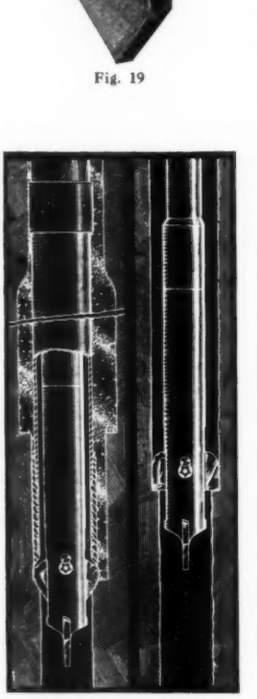


Fig. 20 Fig. 21

BAKER ROTARY HYDRAULIC EXPANSION WALL SCRAPER

The Baker Rotary Hydraulic Expansion Wall Scraper provides a means of enlarging the walls of an open hole to a diameter considerably greater than that of the casing or hole through which the tool is run, and this enlargement may be performed at any desired point. The safety of construction and operation, combined with the amazing reaming capacity of the tool, enables it to perform jobs which have heretofore been considered impossible. A few of the desirable applications of the Baker Wall Scraper include: Scraping Oil Sands Clean From Mud; Enlarging the Hole for Setting Liners; Setting Cement Plugs; Bottlenecking for Cement Jobs; Enlarging Holes for Setting Casing; Directional Drilling; Sidetracking; Straightening Holes; Fishing Jobs; Water Shut-Off Tests.

COMBINES ALL FEATURES

The Baker Hydraulic Expansion Wall Scraper is the *only* under-reamer made that combines *all* of the following features:

Maximum Expansion Range on Cutter Blades from 4″ to 29″ expansion is provided by using only six bodies.

The reaming edges of the blades contact the side of the hole a sufficient distance to give good bearing surface on formation. This construction minimizes any tendency toward "corkscrewing" of the blades; assures an even cut on all sides of hole; and permits faster downward feeding which results in faster cutting action.

Full force of the circulation is directed on the cutting edges of the Blades. All cuttings are removed quickly, the blades are cooled and well lubricated.

It can be converted to take cores from the walls of an open hole by merely changing to Wall Sampler Blades, later described and shown in Figure 24. This exclusive feature is of great importance.

DESIGN AND CONSTRUCTION

The tool consists of an alloy steel body containing a piston to which are connected two blades mounted in such a way that the blades fold into the body while running in and out of the hole. At the desired time the piston is forced downward by the application of pump pressure at the surface, thus expanding the blades outward and upward against the formation, as shown in Figure 20. When rotation is commenced, these blades cut their way to a fully expanded position and are held in this cutting position by the shoulder which they have cut in the formation; see Figure 21. If the formation is soft, the blades are held in their expanded position by pump pressure. Ample circulation holes direct the fluid upon each blade, lubricating and cooling the cutting surface, and carrying the cuttings up and away from the formation being scraped.

The pilot bit below the blades is placed at right angles to the plane of the blades. This pilot bit projects into the small hole ahead of the blades, thus centering the scraper and steadying the cutting action of the blades. The blades themselves have long reaming edges which contact the wall of the hole and provide a good bearing surface against the formation and thus prevents the tool from "corkscrewing." Therefore, it is apparent that the Baker Hydraulic Wall Scraper will follow the hole and will cut to full gauge at all points.

BOTTLENECKING BEFORE CEMENTING

One of the many ways in which the Wall Scraper is used to great advantage is in enlarging the hole a distance of 20 to 40 feet to the bottom of the well bore, as illustrated in Figure 22. This practice will eliminate the possibility of the shoe joint of the casing contacting the well bore in such a manner as to prevent its complete encirclement with cement.

EL RASPADOR DE PARED BAKER QUITA EL BARRO DE LA CARA O SUPERFICIE DE LA ARENA PRODUCTIVA DE PETROLEO. FACILITA LA COLOCACION DE FORROS O REVESTIMIENTOS DE MAYOR DIAMETRO. PREPARA EL AGUJERO PARA MEJOR CEMENTACION

THE BAKER WALL SCRAPER REMOVES MUD FROM THE FACE OF PRODUCTIVE OIL SANDS—MAKES IT EASY TO SET LARGE DIAMETER LINERS OR CASING—PREPARES THE HOLE FOR BETTER CEMENTING

LAS FIRMES CUCHILLAS SE ABREN SIEMPRE BAJO LA PRESION DE LA BOMBA Y SE CIERRAN SIEMPRE CUANDO SE QUITA EL RASPADOR DE PARED DEL AGUJERO. HAY CUCHILLAS ESPECIALES PARA CORTAR MUESTRAS DE LA FORMACION DE LA PARED LATERAL

THE STRONG BLADES ALWAYS OPEN WHEN PUMP PRESSURE IS APPLIED, AND ALWAYS CLOSE WHEN THE WALL SCRAPER IS REMOVED FROM THE HOLE—SPECIAL BLADES TAKE CORES FROM SIDE WALL FORMATION

LAS CUCHILLAS PUEDEN CAMBIARSE FACILMENTE

Los mejores resultados se obtienen cuando el raspador de pared Baker se emplea con cuchillas bien ofiladas y ensanchadas hasta el diámetro del caso. Las cuchillas pueden cambiarse con rapidez y facilidad empleando el depresor de émbolo, que se suministra para simplificar la operación. También se suministran instrucciones completas impresas para el desmontaje e instalación de las cuchillas, con cada raspador de pared.

La selección de adecuados tamaños de diámetro de cuchillas y el número de juegos adicionales (o pares) de cuchillas es muy importante. Para una corta distancia en formación dura, con un pequeño aumento en diámetro, un solo juego de cuchillas es generalmente suficiente. Para raspar o escariar muchos centenares de metros, es, por supuesto, necesario tener más de un juego de cuchillas.

Para un gran aumento en diámetro en formación dura, se emplean diferentes tamaños de cuchillas, para hacer el trabajo gradualmente o en etapas. Los diferentes tamaños de cuchillas y el número de juegos requeridos dependen, naturalmente, de la dureza de la formación y de la extensión del agujero por escariarse.

En las formaciones regularmente blandas, un juego de cuchillas es suficiente para agrandar el agujero a la capacidad máxima del raspador, para la completa extensión del trabajo.

RASPADOR ROTATORIO BAKER DE TIPO HIDRAULICO DE EXPANSION PARA AGUJERO DE FONDO

Esta herramienta es similar al raspador de pared, salvo que el cuerpo está cortado casi al ras del fondo de las cuchillas, como se ve en la figura 23. Los bordes cortantes de las cuchillas se extienden un tanto debajo del fondo del raspador y por esta razón resulta fácil escariar hasta el fondo del agujero, produciéndose así un fondo completamente plano.

El raspador de agujero de fondo se adapta especialmente a la preparación de un hoyo para unión articulada de perforación direccional. Las cuchillas pueden cambiarse con facilidad y la herramienta tiene todos los demás rasgos del raspador de pared.

CORTADOR GIRATORIO DE MUESTRAS BAKER, TIPO HIDRAULICO

El cortador giratorio de muestras Baker, de tipo hidráulico, mostrado en la figura 24, es un dispositivo que saca muestras de las paredes de un agujero abierto, en cualquier punto deseado. Restablece las muestras perdidas; saca muestras de formaciones de las cuales no obtuvieron muestras al ser perforadas. El cortador giratorio de muestras Baker provee también un medio de verificar zonas estudiadas por sistemas eléctricos de sacar muestras.

Esta herramienta consiste en un raspador de pared Baker, descrito más arriba, con un juego especial de cuchillas para cortar muestras, que se instala en lugar del corriente juego de laminas escariadoras. Cada cuchilla cortadora de muestra tiene dos tubos o cañones sacadores de muestra, atornillados en la parte superior del borde exterior plano. Las cuchillas no tienen borde cortador, sino que sirven nada más que para guiar los cañones sacadores de muestra en la formación y recibir cualquiera tensión sobre los cañones o tubos mientras las cuchillas están penetrando en las paredes del agujero.

Fig. 22

Fig. 23

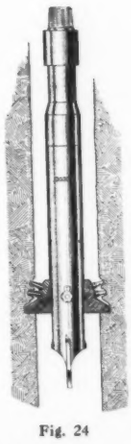


Fig. 24

BLADES ARE EASILY CHANGED

Best results will be secured with the Baker Wall Scraper by using blades that are sharp and out to gauge. The blades are quickly and easily changed by using a Plunger Depressor provided to simplify the operation, and by following printed instructions for removal and installation of blades, furnished with each Wall Scraper.

The selection of suitable "gauge" sizes of Blades and the number of extra sets (or pairs) of Blades is very important. For a small footage in hard formation, with only a small increase in diameter, one set of Blades usually is sufficient. To ream many hundreds of feet it is obvious that more than one set will be required.

For a large increase in diameter in hard formation, different size blades are used to ream out in stages. The different sizes of blades and the number required naturally depend on the hardness of the formation and the footage to be scraped.

In fairly soft formations, one set of Blades will usually enlarge the hole, to the maximum reaming capacity of the Wall Scraper, for the entire footage to be reamed.

BAKER ROTARY HYDRAULIC EXPANSION BOTTOM HOLE SCRAPER

This tool is similar to the Wall Scraper except that the body is cut off approximately even with the bottom of the blades; see Figure 23. The cutting edges of the blades extend slightly below the bottom of the scraper and it is an easy matter to underream to the bottom of the hole, leaving an absolutely flat bottom to the underreamed section.

The Bottom Hole Scraper is especially adaptable for preparing a hole for use of a knuckle joint in directional drilling. The blades are readily changed and the tool has all the other features of the Wall Scraper.

BAKER ROTARY HYDRAULIC WALL SAMPLER

The Baker Hydraulic Wall Sampler (shown in Figure 24) is a device which will actually take samples or cores from the walls of an open hole at any point desired. It restores records when cores are lost; it samples formations which were not cored when drilled through. The Baker Rotary Hydraulic Wall Sampler also provides a means of checking interesting zones indicated by electrical coring methods.

This tool consists of a Baker Wall Scraper, as described above, with a special set of Sampler Blades mounted in place of the usual scraper blades. Each sampler blade has two core-taking tubes screwed into the upper section of the flat outer edge. The blades do not have a cutting edge, but serve only to guide the core-taking tubes into the formation and to take any strain off the tubes as the blades are forced into the walls of the hole.

THE BOTTOM HOLE SCRAPER IS USED FOR FISHING JOBS, IN DIRECTIONAL DRILLING, AND FOR ENLARGING THE HOLE TO SECURE BETTER CEMENTING RESULTS. THE WALL SAMPLER TAKES ACTUAL CORES FROM THE FORMATION AT ANY POINT IN AN OPEN HOLE.

EL RASPADOR DE FONDO DE AGUJERO SE UTILIZA PARA TRABAJOS DE PESCA, PERFORACION DIRECCIONAL Y PARA EL AGRANDAMIENTO DEL AGUJERO A FIN DE ASEGURAR MEJOR TRABAJO DE CEMENTACION. EL SACADOR DE MUESTRA DE PARED SACA VERDADERAS MUESTRAS DE LA FORMACION EN CUALQUIER PUNTO DE UN AGUJERO ABIERTO, DONDE NO SE HA COLOCADO TODAVIA REVESTIMIENTO.

LAS DIRECCIONES DE LAS OFICINAS DE LA COMPANIA BAKER APARECEN EN LA ULTIMA PAGINA DE ESTA SECCION

ADDRESSES OF BAKER OFFICES ARE LISTED ON THE LAST PAGE OF THIS SECTION

BAKER

BAKER

CONVIENE SACAR MUESTRAS CON UN CANON O TUBO SACADOR DE MUESTRA BAKER ACCIONADO CON CABLE DE HERRAMIENTA. ESTAS MUESTRAS COMPRUEBAN SI LA FORMACION ARENOSA TIENE PETROLEO, PRODUCE AGUA O ESTA SECA. SIRVE PARA DETERMINAR EXACTAMENTE LOS CIERRES DE AGUA Y OBTENER MUESTRAS COMPLETAS DE CUALQUIERA FORMACION PARA SU DETENIDO EXAMEN. EL GASTO ES BAJO Y LOS RESULTADOS PRODUCIDOS SON MUY VALIOSOS.

IT PAYS TO TAKE CORES WITH A BAKER CABLE TOOL CORE BARREL. SECURE POSITIVE PROOF WHETHER A SAND IS OIL BEARING, WATER BEARING OR DRY—ALSO TO DETERMINE EXACT LOCATIONS FOR WATER SHUT-OFFS AND TO HAVE COMPLETE SAMPLES OF ANY FORMATION FOR STUDY. COSTS ARE LOW, RESULTS ARE INVALUABLE.

QUEDA UD. INVITADO A VISITAR NUESTRAS FABRICAS A LA PRIMERA OPORTUNIDAD QUE SE LE PRESENTE

YOU ARE INVITED TO VISIT OUR PLANTS WHENEVER IT IS POSSIBLE FOR YOU TO DO SO

CANON O TUBO SACADOR DE MUESTRA BAKER, TIPO DE PERCUSION, ACCIONADO POR CABLE

Esta herramienta no sólo satisface los requisitos del geologista, sino que es también muy popular entre los explotadores, a causa de que combina invariable seguridad en la extracción de muestras con sencillez en funcionamiento y precisión en la hechura del agujero. Esta herramienta se ilustra en esta página. Los completos y exactos datos sobre la formación que se obtienen mediante el cañón sacador de muestra Baker, tipo de percusión, provee: (1) conocimiento de las capas de arenas de baja presión o de capas de arenas que puedan hacerse productiva por conmoción; (2) sitio exacto para los asientos de revestimiento y efectivos cierres de agua; (3) información sobre zonas arenosas que puedan separar capas productivas de agua y capas productivas de petróleo, y sobre estratas arenosas con contenido de petróleo; (4) muestras para estudiar la porosidad, saturación y permeabilidad; (5) verificación de si la arena contiene petróleo, agua o si es seca; (6) datos para estudio litográficos y paleográficos.

UN METODO SENCILLO Y POSITIVO DE SACAR MUESTRAS

No hay que hacer ningún ajuste complicado cuando se emplea el cañón sacador de muestra Baker. Con el agujero en buena condición de perforación y seco, y lo más a prueba posible de hundimientos, se examinan, en primer lugar, dos válvulas, y se verifica el filo de los dientes cortantes de la zapata del cañón de perforación. Se queda así listo para sacar muestras perfectas en muy limitado tiempo y al costo más bajo posible.

El sacar muestras es tan rápido como la perforación rectilínea, cuando se emplean las zapatas de cañón de perforación del nuevo tipo.

La forma en que se obtienen las muestras depende, en gra medida, de la misma formación. En formaciones duras, las muestras generalmente no se obtienen en una pieza larga, sino que salen en la forma de discos cilíndricos de variables longitudes, como se ve en la figura 27. En formaciones blandas y quebradas, la acción de este cañón sacador de muestras es verdaderamente admirable, pues produce muestras con las secciones de la formación en su exacta relación y posición. Aunque la muestra obtenida pueda estar fracturada en secciones, a su salida, es, sin embargo, completa y exacta, a causa de que no lleva ninguna contaminación.

Además de suministrar datos visibles para su examen, las muestras producidas mediante el cañón Baker resultan muy adecuadas en tamaño y en carácter para los ensayos de laboratorio en lo tocante a permeabilidad, porosidad y saturación.

El cañón sacador de muestra consta de dos partes principales: un tubo exterior de perforación y un tubo interior para la retención de la muestra. El tubo interior de retención de muestra no se levanta en ningún momento después de empezado el trabajo de cortar la muestra, sino hasta que la herramienta se saca del agujero. En la figura 26 ilustramos el tubo interior, al fondo, con el tubo exterior levantado. El cañón o tubo exterior se desliza por este tubo interior y corta la formación que hay a su alrededor. Esto permite al tubo de retención de muestra bajar a recoger una verdadera muestra de la formación. Un rasgo importante es la válvula esférica de retención, que permite que el agua atrapada en el tubo interior se escape a medida que este tubo se está llenando con la muestra. Esto evita que el líquido bajo presión actúe sobre la muestra.

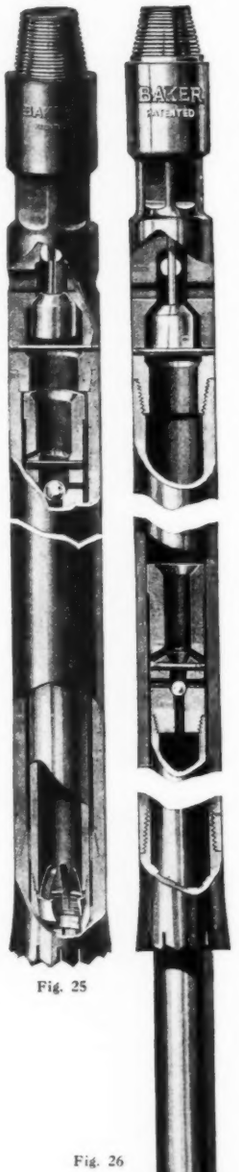


Fig. 25

Fig. 26

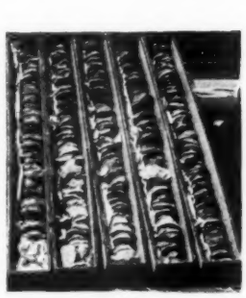


Fig. 27

BAKER (PERCUSSION) CABLE TOOL CORE BARREL

This tool not only meets the requirements of the geologist, but is popular with the operator because it combines consistently reliable coring with simplicity of operation and hole-making ability. It is illustrated opposite. The complete and accurate formation data secured by the Baker (Percussion) Cable Tool Core Barrel provides (1) Knowledge of low-pressure sands or sands that might be made productive by shooting; (2) Exact locations for casing seats and effective water shut-offs; (3) Information on sand breaks which may separate water-bearing and oil-bearing horizons, and on fractured oil sands; (4) Samples for porosity, saturation and permeability tests; (5) Proof as to whether a sand is oil-bearing, water-bearing or dry; (6) Facts for lithographic and paleographic study.

A SIMPLE, POSITIVE CORING METHOD

There are no complicated adjustments to be made when the Baker Cable Tool Core Barrel is used. With the hole in good drilling condition and bailed as free as possible of cavings, two valves are examined and the sharpness of the cutting teeth on the Drill Barrel shoe checked. You are then ready to take perfect cores in minimum time at lowest cost.

Coring is usually as fast as straight drilling, particularly when new Drill Barrel Shoes are used.

The form in which the core is recovered depends to a large extent on the formation. In hard formations the cores are usually not recovered in one long piece but take the form of round discs of varying lengths as illustrated in Figure 27. In soft or broken formations the action of this Core Barrel is truly remarkable in recovering cores with the sections of formations in their exact relationship and position. While the core taken may be fractured into sections during its recovery, the whole core is secured and there is no contamination of the sample.

In addition to providing visual data for examination, the cores recovered by the Baker Cable Tool Core Barrel are sure to be suitable in size and character for laboratory tests on permeability, porosity and saturation.

The Core Barrel consists of two main parts —an outer Drilling Barrel and an inner Core-Retaining Tube. The inner Core Retaining Tube does not move upward at any time after coring is started until the tool is pulled from the hole. Figure 26 illustrates the Inner Tube on bottom with the Outer Barrel raised. The outer Drilling Barrel slides on this Tube and cuts away the formation around it. This permits the Core Retaining Tube to follow down over the undisturbed cylinder of formation and secure a true sample as it actually lies in the ground. An important feature is the Ball Check Valve that permits water trapped in the Inner Core Tube to escape as the Tube fills with the core. This prevents any fluid under pressure from acting on the core.

CUALQUIER PERFORADOR DE EXPERIENCIA PUEDE OBTENER BUENAS MUESTRAS INMEDIATAMENTE CON UN CANON BAKER DE HERRAMIENTA DE CABLE. NO ES COMPLICADO. EL COSTO DE LAS MUESTRAS RESULTA MUY BAJO. EL PORCENTAJE DE MUESTRAS OBTENIDAS ES SINGULARMENTE MUY ALTO

ANY EXPERIENCED DRILLER CAN SECURE GOOD CORES IMMEDIATELY WITH A BAKER CABLE TOOL CORE BARREL. IT IS NOT COMPLICATED—COSTS OF CORING ARE LOW—CORE RECOVERIES ARE EXCEPTIONALLY HIGH

NO HAY NECESIDAD DA HACER SUPOSICIONES ACERCA DE LA FORMACION, EN VISTA DE LA INSUFICIENTE EVIDENCIA PRESENTADA POR MUESTRAS RECOGIDAS CON CUHARON U OTRAS HERRAMIENTAS SIMILARES. EL CANON SACADOR DE MUESTRA BAKER DE CABLE DE HERRAMIENTA SE PRESTA A FACIL MANEJO Y SU COSTO DE CONSERVACION ES MUY MODERADO

NOW YOU DO NOT NEED TO GUESS ABOUT FORMATIONS WITH INSUFFICIENT EVIDENCE SECURED FROM BAILER SAMPLES—THE BAKER CABLE TOOL CORE BARREL IS SIMPLE TO OPERATE AND THE COSTS OF MAINTAINING IT ARE VERY REASONABLE

FUNCIONAMIENTO DEL CANON O TUBO SACADOR DE MUESTRA BAKER, ACCIONADO POR CABLE

Bajo condiciones normales promedias, la extracción de muestras, con un cañón o tubo sacador de muestra Baker, debe dar un rendimiento de más de 90%.

El agujero debe hallarse en la mejor condición posible y contener suficiente líquido para cubrir las herramientas. El cañón sacador de muestra se coloca en la misma posición que una barrena perforadora, con agitadores de perforación de regulación encima de un vástago de perforación de regulación. Se emplea una conexión firme. El empleo de una conexión firme se debe al hecho de que el cañón sacador de muestra tiene que funcionar con menor movimiento durante la perforación que una barrena de perforación corriente, y también, con un poquito más de soltura en la línea, que en el caso de una perforación rectilínea. No debe emplearse una conexión giratoria, pues esta puede permitir un movimiento irregular a la línea, impidiendo que el cañón sacador de muestra trabaje uniformemente durante todo el tiempo de su funcionamiento.

Después de introducir el cañón sacador de muestra hasta el fondo, se le levanta no más de 3 pies. Esto evita levantar el tubo interior por el fondo. Una vez tocado el fondo, la conexión se hace lo mismo que si fuera una de barrena perforadora normal. Luego se destornilla hasta que se sientan que los agitadores se separan al final de la carrera descendente. Córrase a razón de 20 a 30 carreras por minuto, dependiendo de la profundidad y condición del hoyo. Cuando el pozo tiene más de 1500 pies de profundidad, se recomienda colocar el pasador en el segundo orificio.

En formación muy dura, el trabajo debe hacerse con una línea más apretada o tiesa. Muchos explotadores parecen tener miedo de hacer funcionar el cañón sacador de muestra como debe haerse. Es necesario olvidar este miedo. Por esta razón debe quitarse el tornillo periódicamente para que las herramientas funcionen con fuerza uniforme durante todo el tiempo en que se está sacando la muestra.

TENAZAS DE CANON SACADOR DE MUESTRA BAKER, ACCIONADO POR CABLE

Dos diferentes tipos de tenazas se necesitan para atornillar bien las juntas del cañón sacador de muestra Baker. Un juego de dos tenazas se emplea para el tubo perforador exterior, y otro juego de dos tenazas se necesita para el tubo interior sacador de muestra.

Las tenazas Baker de tubo perforador se hacen para usarse con círculo de piso y gato. Tienen mangos abisagrados, para obtener debido ángulo en las tenazas entre la junta y el círculo, para que se establezca buena conexión con el gato, como se ve en la figura 29.

Las tenazas Baker de tubo sacador de muestra son de construcción muy firme y no arrugan al tubo sacador de muestra o zapata auxiliar, como a menudo sucede con las tenazas o mordazas de cadena. Véase la figura 28.

EXTRACTOR HIDRAULICO DE MUESTRA Y BOMBA DE ENSAYO BAKER

Esta bomba de funcionamiento manual es firme y sencilla en construcción. La ilustramos en la figura 30. Desarrolla una presión enorme sin que requiera indebida fuerza física. Es compacta, ligera en peso y se adapta a extraer muestras de cañones rotativos y accionados por cable. Se emplea también como bomba de ensayo. Tiene dos émbolos, el uno para baja presión y el otro para alta presión.

Mediante la bomba de extractor de muestra y con la ayuda de émbolos empujadores de muestra y auxiliares, las muestras pueden quitarse sin daño alguno.

Para el ensayo de tubos y accesorios de tubería, y para cualquier servicio donde se requiera una bomba de ensayo portátil y de fácil funcionamiento, la presente no tiene rival. Fácilmente pueden desarrollarse presiones hasta de 6000 libras por pulgada cuadrada.

Fig. 28

Fig. 29

OPERATING THE BAKER CABLE TOOL CORE BARREL

Under average conditions, core recovery with the Baker Cable Tool Core Barrel should be over 90 per cent.

The hole should be in the best condition possible and contain sufficient fluid to cover the tools. The Core Barrel is placed in the same position as a drilling bit with regulation drilling jars located on top of a regulation drilling stem. Use a stiff socket. The reason for using a stiff socket is that the Core Barrel has to be run with a slower drilling motion than a standard drilling bit and with a little more looseness in the line than when doing straight drilling. Do not use a swivel socket which would allow the line to take-up and let-out while coring. This would prevent the Core Barrel from working uniformly at all times while the core is being taken.

After running the Core Barrel to bottom it is not picked up over 3 feet. This will prevent lifting the Inner Barrel off bottom. After finding bottom connect on the same as with a standard drilling bit. Then let the screw out until you can just feel the jars part on the bottom of the down stroke. Run from 20 to 30 strokes per minute, depending on the depth and condition of the hole. If the well is more than 1500 feet in depth, it is recommended that the wrist pin be placed in the second hole.

If the formation is exceptionally hard, run with a little tighter line. Many operators seem afraid to operate the Core Barrel as they should. This feeling of fear must be overcome. Let the screw out regularly so that the tools will strike with the same force all the time the core is being taken.

BAKER CABLE TOOL CORE BARREL TONGS

Two different types of tongs are necessary for properly screwing up the joints on the Baker Cable Tool Barrel; one set of two tongs is used for the outer Drill Barrel, and another set of two for the inner Core Tube.

Baker Drill Barrel Tongs are made for use with the floor circle and jack. They have hinged handles to secure the proper angle on the tongs between the joint and circle, so as to properly engage with the jack. See Figure 29.

Baker Core Tube Tongs are made extra strong and will not crimp the core tube or trimmer shoe, as so often happens with chain tongs. See Figure 28.

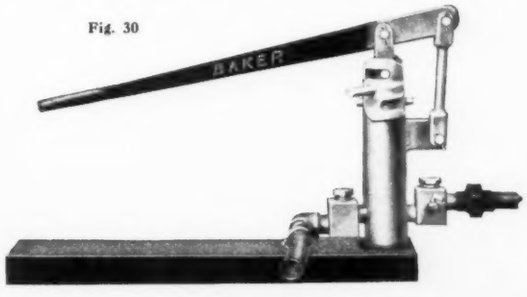
BAKER HYDRAULIC CORE EXTRACTOR AND TESTING PUMP

This hand operated pump is strong and simple in design and construction. See Figure 30. It will develop enormous pressures without undue exertion. It is compact, light in weight, and is suitable both to extract cores from Rotary or Cable Tool Core Barrels and for use as a Testing Pump. It has two pistons—one for low pressure and one for high pressure.

By means of the Core Extractor Pump and by using Baker Core Pusher Plungers and Core Extractor Subs, cores can be readily removed without damage to the sample.

For testing pipe or fittings, or for any service where a portable, easily operated Test Pump is desired, this device has no equal. Pressures up to 6000 lbs. per square inch can be exerted with ease.

Fig. 30



DRILLERS LIKE TO OPERATE A BAKER CABLE TOOL CORE BARREL BECAUSE IT ALWAYS TAKES GOOD CORES AND LITTLE IF ANY TIME IS LOST IN INCREASING THE DEPTH OF THE HOLE. THE CORE EXTRACTOR ALSO SERVES AS A HAND OPERATED TESTING PUMP TO DEVELOP PRESSURES AS HIGH AS 6000 POUNDS PER SQUARE INCH.

LOS PERFORADORES PREFIEREN EL CANON SACADOR DE MUESTRAS, DE MARCA BAKER, PORQUE ESTAN SEGUROS DE OBTENER BUENAS MUESTRAS Y DE NO PERDER TIEMPO EN AUMENTAR LA PROFUNDIDAD DEL AGUJERO. EL EXTRACTOR HIDRAULICO DE MUESTRA SIRVE TAMBIEN COMO BOMBA DE ENSAYO MANUAL, PARA DESARROLLAR PRESIONES HASTA DE 6.000 LIBRAS POR PULGADA CUADRADA.

BAKER

PARA INFORMACION DETALLADA, VEASE LA SECCION BAKER DEL CATALOGO DE COMBINACION

FOR COMPLETE INFORMATION REFER TO THE BAKER SECTION IN THE COMPOSITE CATALOG

BAKER

LE CONVIENE A UD. ENTERARSE DE ESTE EFICAZ APARATO

IT WILL PAY YOU WELL TO LEARN ALL ABOUT THIS EFFICIENT DEVICE

DESPUES DE QUE HAYA LEIDO AQUI LA BREVE DESCRIPCION DE COMO EL RETENEDOR DE CEMENTO BAKER, MODELO "F" PUEDE EMPLEARSE EN MUCHOS TRABAJOS ESPECIALES DE CEMENTACION, SIRVASE ESCRIBIRNOS PARA NOSOTROS ENVIARLE UN FOLLETO DESCRIPTIVO E ILUSTRATIVO DE SUS VARIAS APLICACIONES PRACTICAS Y LUCRATIVAS A LOS REQUISITOS DE SU PROPIO TRABAJO.

AFTER READING HERE THE SHORT DESCRIPTION OF HOW THE BAKER MODEL F CEMENT RETAINER CAN BE USED FOR MANY SPECIAL CEMENTING OPERATIONS, WRITE TO US FOR A COMPLETE BOOKLET WHICH ILLUSTRATES AND DESCRIBES HOW YOU CAN USE IT SUCCESSFULLY AND PROFITABLY IN YOUR WORK.

RETENEDOR DE CEMENTO CON JUNTA DE CIRCULACION MODELO BAKER F SE EMPLEA TAMBIEN COMO TAPON DE CONEXION DE REVESTIMIENTO

El retenedor de cemento resuelve muchos problemas corrientes y extraordinarios en trabajos de cementación, debido a que provee un medio seguro de colocar el cemento a traves de tubería corriente o tubería de perforación, en el punto donde resulta verdaderamente efectivo: alrededor de la zapata, o en cualquier punto predeterminado, a través de perforaciónes detrás del revestimiento o forro. Elimina el peligro del atascamiento u obturación de la tubería corriente o tubería de perforación, que se presenta a menudo en el método de cementación "a traves de la tubería". Se adapta a cualquier presión y resulta sumamente adecuado a la cementación cuando la circulación es difícil o imposible de lograrse.

El retenedor de cemento se emplea también como tapón de conexión en revestimientos o forros. Cuando se coloca como tapón en cualquier punto, establece correcta obturación, evitando el movimiento ascendente o descendente del líquido o del gas, por el agujero.

El retenedor de cemento se usa mucho en conexión con *trabajos de obturación, de cementación de reparación detrás de secciones de tubos, cementación en serie, obturación de líquidos de fondo, obturación de zonas superiores, ensayo de formaciones superiores canalizadas, como tapón de desplazamiento y también, para toda clase de trabajos de reparación de pozos de perforación y pozos productores, donde haya revestimiento.*

El retenedor de cemento Baker, modelo F, consiste en un cuerpo, un grupo de disparo y una junta de circulación, tal como se muestra completo en la figura 31. Solo el cuerpo del retenedor queda en el pozo. El grupo del disparador y la junta de circulación se quitan con el cable a continuación inmediata del trabajo de cementación o de la colocación del tapón de conexión de revestimiento. Bajo ciertas condiciones, algunos explotadores siguen la práctica de usar un tuvo de cola debajo del retenedor de cemento, para descargar el cemento en un punto predeterminado debajo del retenedor.

PRINCIPIO DE FUNCIONAMIENTO

Después de que el retenedor de cemento ha llegado a su posición en el revestimiento o forro, se inserta un disparador de bola en el tubo de bajada, como se ve en la figura 32. Cuando este disparador de bola desciendo por el tubo hasta llegar a su asiento en el cuerpo del retenedor (véase la figura 33) se aplica presión hidráulica a la bola, mediante las bombas y esta acción hidráulica dispara el juego superior de sujetadores o patines y abre la válvula de contrapresión. Los patines superiores se afirman y permiten la soltura y colocación de un juego inferior de patines y la expansión de un obturador de caucho, al tirar hacia arriba del tubo. Los patines o sujetadores superiores evitan todo movimiento hacia arriba y los patines o sujetadores inferiores evitan todo movimiento del retenedor hacia abajado.

El movimiento ascendente del líquido o del gas, a través del retenedor de cemento o tapón de conexión, una vez colocado, se evita mediante una válvula de contrapresión. El movimiento descendente del líquido, a través del retenedor de cemento, puede evitarse, cuando sea necesario, mediante una bola de cementación, la cual, con la ayuda de la bomba, se baja por el tubo hasta que llega a un asiento provisto para ella en el cuerpo del retenedor. Cuando se emplea como tapón de conexión, se emplea una bola pesada, procediéndose lo mismo que en el caso anterior, o bien, puede dejarse caer en el revestimiento después de que se quite el tubo de bajada. Véase la figura 34.

La junta de circulación se coloca encima del retenedor de cemento o tapón de conexión de revestimiento, en todas sus aplicaciones. Esto asegura independencia de toda tensión mientras se destornilla el cuerpo del retenedor; provee una junta flexible, que permite pasar por un agujero torcido; permite un medio de extraer líquido o cemento de la tubería o tubo de perforación, en cualquier momento, durante el trabajo; y suministra un medio de circulación o de derivación, que está siempre a inmediata disposición en casos de apuro.

Fig. 31

Fig. 32 Fig. 33

Fig. 34

BAKER MODEL F CEMENT RETAINER WITH CIRCULATION JOINT

Also Used as Casing Bridge Plug

The Cement Retainer solves many usual and unusual cementing problems by providing a sure means of placing cement through tubing or drill pipe at the point where it will really be effective —either around the shoe, or at any predetermined point, through perforations behind casing or liner. It eliminates the danger from sticking or plugging tubing or drill pipe, as with the "tubing method" of cementing; it is adaptable to any pressures and is particularly suitable for cementing when circulation is difficult or impossible to obtain.

The Cement Retainer is also used as a Bridge Plug in casing or liner and when set as such at any point, packs off securely to prevent the movement of liquid or gas either up or down the hole.

The Cement Retainer is widely used for *Squeeze Jobs; Recementing; Cementing Behind Sections of Pipe; Series Cementing; Plugging Off Bottom Fluids; Plugging Back to Upper Zones; Testing Upper Cased Formations; As a Heaving Plug;* and *For All Kinds of Repair Work in Drilling and Producing Wells where Casing is in the hole.*

The Baker Model F Cement Retainer consists of the Retainer Body, the Trip Assembly and the Circulation Joint complete as shown in Figure 31. Only the Retainer Body is left in the well; the Trip Assembly and Circulation Joint are removed with the Run-In Pipe immediately upon completion of a cementing job or the setting of a Casing Bridge Plug. Under certain conditions, it is the practice of some operators to use a Tail-Pipe below the Cement Retainer in order to discharge the cement at a predetermined point below the Retainer.

OPERATING PRINCIPLE

After the Cement Retainer has reached its position in the casing or liner a Trip Ball is inserted in the Run-In Pipe, as shown in Figure 32. When the Trip Ball has gravitated down through the run-in pipe to its seat into the body of the Retainer (see Figure 33), hydraulic pressure is applied to the ball by the pumps and this hydraulic action trips the upper set of slips and releases the back-pressure valve. The upper slips set and permit the release and setting of a lower set of slips and the expanding of a rubber packer by pulling up on the run-in pipe. The upper slips prevent any upward movement and the lower slips prevent any downward movement of the Retainer.

Upward liquid or gas movement through the Cement Retainer or Bridge Plug when set is prevented by a back-pressure valve. Downward fluid movement through the Cement Retainer may be prevented when necessary by a Cementing Ball which is pumped down the tubing to a seat provided in the Retainer Body. When used as a Bridge Plug, a heavy Bridging Ball is similarly pumped down the Run-In Pipe or may be dropped into the casing after the Run-In Pipe is removed. See Figure 34.

The Circulation Joint is run above the Cement Retainer or Casing Bridge Plug in all applications. This insures relief from all strain when unscrewing from the Retainer Body; it provides a flexible joint which facilitates running in a crooked hole; it furnishes a means of bleeding out fluid or cement from the tubing or drill pipe at any time during operations; and it furnishes a circulation medium or by-pass that is always available for specific uses or in cases of emergencies.

EL RETENEDOR DE CEMENTO BAKER, MODELO "F", COLOCA EL CEMENTO, A TRAVES DE LA TUBERIA O TUBO DE PERFORACION, EN CUALQUIER PUNTO DESEADO. PUEDE TAMBIEN EMPLEARSE CON UN EFECTIVO TAPON DE CONEXION Y SER DESPUES PERFORADO, SI ES NECESARIO

THE BAKER MODEL F CEMENT RETAINER PLACES CEMENT THROUGH TUBING OR DRILL PIPE AT ANY DESIRED POINT. IT CAN ALSO BE USED AS A VERY EFFICIENT CASING BRIDGE PLUG AND DRILLED OUT AT A FUTURE TIME IF DESIRED

EL GRUPO DE LA VALVULA PUEDE QUITARSE A MANO DE UN FLOTADOR DE TUBO DE PERFORACION BAKER BAKWIK, MIENTRAS EL CUERPO PERMANECE EN LA LINEA DE PERFORACION. OFRECE SEGURIDAD Y CONVENIENCIA, MAS TODAS LAS VENTAJAS DE UNA VALVULA DE CONTRAPRESION

THE VALVE ASSEMBLY CAN BE REMOVED BY HAND FROM A BAKER BAKWIK DRILL PIPE FLOAT WHILE THE BODY REMAINS IN THE DRILLING STRING. IT OFFERS YOU MODERN SAFETY AND CONVENIENCE PLUS ALL THE ADVANTAGES OF A POSITIVE BACK PRESSURE VALVE

FLOTADORES BAKER "BAKWIK" DE TUBO DE PERFORACION

El flotador Baker "Bakwik" de tubo de perforación ofrece las muchas ventajas de una válvula de contrapresión en la línea de perforación, con el grupo de válvula construído enteramente sin roscas, quedando sujeto en posición por el pasador de la unión de herramienta, colocado encima de él, como se ve en la figura 35. Este grupo de válvula sencillamente se baja en la "junta flotante" sin la ayuda de llaves o de otras herramientas especiales. Se quita sencillamente levantándolo con la mano, como se ve en la figura 36, habiendo una abertura amplia y sin obstrucción por el cuerpo de la junta flotante.

Los flotadores Baker "Bakwik" de tubo de perforación se ofrecen en dos tipos. El ripo regular, se emplea con juntas de herramientas de patrones regulares A.P.I. y Acme, y provee un paso, a través de la válvula, casi igual a la área de la junta de herramienta. El tipo de agujero completo sirve especialmente para juntas de herramientas rotativas, de tipo perfilado, de patrones A.P.I. y Acme. Tiene un paso sin restricción, casi igual al área de la junta de herramienta.

La "junta flotante" de cualquier tipo no se quita durante el trabajo. Puede bajarse todo lo que se quiera mientras lo resista la firmeza del tubo. Cuando el tubo de perforación se mantiene lleno de líquido, puede colocarse encima del collar del taladro o barrena.

Fig. 35

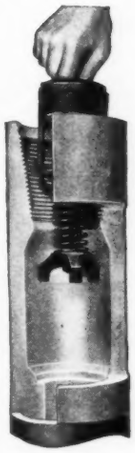


Fig. 36

FLOTADOR BAKER DE TUBO DE PERFORACION (con válvula de tipo tornillo)

El flotador Baker de tubo de perforación, con válvula de tipo de tornillo, tiene una firme válvula de contrapresión, hecha de hierro fundido, según se ve en la figura 39, que se atornilla en la junta flotante del tubo de perforación. Se diferencia del tipo Bakwik principalmente en que no puede ser colocada y retirada con la misma facilidad. La válvula en posición se ilustra en la figura 37.

La moderna práctica de emplear petróleo como flúido de circulación indica un importante uso para los flotadores de tubo de perforación con válvula de tipo de tornillo. Este eficaz y seguro flotador de tubo de perforación elimina la posibilidad de serio daño durante la entrada y la salida del tubo perforador.

En ciertos yacimientos de alta presión, se emplean hasta cinco flotadores de tubo de perforación, separados a intervalos reguladores en toda la extensión de la línea. Esta práctica permite tener una segura válvula de contrapresión cerca de la parte superior de la línea, en caso de que se presente la necesidad de tener que sacar el tubo de perforación, a continuación, de algún desarreglo.

Fig. 38

Fig. 37

COLLAR DE FLOTADOR DE TUBERIA BAKER

Este collar es una modificación del collar de flotador de tubo de perforación Baker, con válvula de tipo de tornillo, como se ve en la figura 38. El empleo principal de esta unidad es limpiar la arena de los pozos productivos. Se hace de modo que ajusta en lugar de un acoplamiento y se inserta con facilidad en una hilera de tubería. Es más firme que la tubería, no produce escape y evita el flujo del petróleo por la tubería mientras va en descenso.

Otros empleos del collar de flotador de tubería son eliminar el peligro de todo contraflujo, cuando se está dando al pozo un tratamiento ácido, y suprimir toda acción de golpe en los pozos con corriente natural o con corriente promovida por el gas. Cuando la corriente o flujo sale por la tubería, el collar del flotador se invierte, pero cuando sale por el revestimiento, se coloca en su posición natural en la hilera de tubería.

Fig. 39

BAKER "BAKWIK" DRILL PIPE FLOATS

The "Bakwik" Drill Pipe Float provides the many advantages of a back-pressure valve in the drilling string with a valve assembly constructed entirely without threads, being held in position by the tool joint pin above it as shown in Figure 35. This valve assembly is merely dropped into place in the "float joint" without the aid of wrenches or special tools. It is removed by simply lifting it out by hand (see Figure 36), and a full, unrestricted opening is provided through the float joint body.

"Bakwik" Drill Pipe Floats are furnished in two types. The Regular Type is for use with A.P.I. Regular or Acme Regular tool joints and provides a passageway through the valve practically equal to the area through the tool joint. The Full Hole Type is designed for A.P.I. Full Hole and Acme Streamline Rotary Tool Joints and has an unrestricted passageway approximately the area through the Full Hole Tool joint.

The "float joint" of either type never has to be removed during operation. It can be run as far from the top of the hole as the collapsing strength of the pipe will permit. If drill pipe is kept filled with fluid it may be placed on top of the bit or drill collar.

BAKER DRILL PIPE FLOAT (With "Screw Type Valve")

The Baker "Screw Type Valve" Drill Pipe Float has a strong cast-iron back-pressure valve assembly (shown in Figure 39) which screws into the drill pipe float joint and differs from the Bakwik type principally in that it cannot be removed and replaced with the same ease. For valve in position refer to Figure 37.

The modern practice of using oil as the circulating fluid indicates an important use for "Screw Type Valve" Drill Pipe Floats. This safe and efficient Drill Pipe Float eliminates the possibility of serious danger while going in or coming out of the hole with drill pipe.

In certain high pressure fields, as many as five drill pipe floats are spaced at intervals from top to bottom of the drill string. This practice insures having a safe back-pressure valve close to the top of the string in event it should become necessary to pull the drill pipe after a twist-off.

BAKER TUBING FLOAT COLLAR

This collar is a modification of the Baker "Screw Type Valve" Drill Pipe Float Collar (see Figure 38). The primary use of this device is to clean out sand in producing wells. It is made to fit in the place of a coupling and is easily inserted in a string of tubing. It is stronger than the tubing, will not leak, and prevents the flow of oil through the tubing while running in.

Other uses for the Tubing Float Collar are to eliminate danger from any back flow when treating a well with acid, and to eliminate any hammering action in wells flowing naturally or by gas lift. When the flow is through the tubing, the Float Collar is inverted; when from the casing, it is placed in its normal position in the tubing string.

THIS POSITIVE, LEAK PROOF BACK PRESSURE VALVE HAS MANY FEATURES OF SAFETY AND EFFICIENCY. IT IS MADE IN BOTH A THREADLESS BAKWIK TYPE AND A SCREW TYPE FOR USE WITH ALL TOOL JOINTS. THE BAKER TUBING FLOAT COLLAR IS USED FOR CLEANING OUT SAND FROM PRODUCING WELLS AND OTHER SPECIAL SERVICE.

ESTE GRUPO DE VALVULA DE CONTRAPRESION OFRECE MUCHAS VENTAJAS EN SEGURIDAD Y RENDIMIENTO. SE OFRECE EN TIPO BAKWIK SIN ROSCAS Y EN TIPO DE TORNILLO PARA USO CON JUNTAS DE HERRAMIENTAS DE TODAS CLASES. EL COLLAR DE FLOTACION DE TUBO BAKER SE USA PARA LIMPIAR LA ARENA DE POZOS EN PRODUCCION Y PARA OTROS SERVICIOS PRACTICOS.

A SOLICITUD LE ENVIAREMOS EJEMPLAR DEL GRAN CATALOGO BAKER

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BAKER

BAKER

ESTE APARATO PUEDE TRANSPORTARSE CON FACILIDAD EN CAMION PEQUENO O EN VAGON DE REMOLQUE. PRONTO COMPENSA SU PRECIO CON LOS AHORROS EN GASTO Y TIEMPO QUE PRODUCE EN LOS TRABAJOS DE ENDEREZAMIENTO DE TUBERIAS Y PIEZAS KELLY. DE FACIL MANEJO Y RESULTADOS POSITIVOS.

THIS DEVICE IS EASILY TRANSPORTED ON A SMALL TRUCK OR TRAILER AND WILL SOON PAY FOR ITSELF BY SAVINGS IN TIME AND BY ELIMINATING EXPENSE OF HAULING KELLYS & DRILL PIPE TO THE SHOP FOR STRAIGHTENING. IT IS EASY TO OPERATE AND RESULTS ARE ALWAYS SUCCESSFUL.

LOS EXPLOTADORES EN EL EXTRANJERO DEBERIAN ESTUDIAR A FONDO ESTE EQUIPO

FOREIGN OPERATORS SHOULD KNOW ALL DETAILS ABOUT THIS EQUIPMENT

ENDEREZADOR HIDRAULICO PORTATIL BAKER PARA KELLY Y TUBO

Este eficaz dispositivo de fácil funcionamiento utiliza el principio del ariete hidráulico, aplicando la fuerza desarrollada por una bomba manual, a cualquier curva en el kelly, collar de perforación o tubo de perforación, mientras el grupo está suspendido de la grúa. El equipo puede transportarse fácilmente al pozo en un pequeño camión o vagón de remolque, y con la ayuda de roldana u otro aparejo similar, colocarse bien sobre la plataforma de la rotativa, para hacer el trabajo, como se ve en la ilustración 40.

Con este equipo, se cuenta con la ventaja de poder enderezar las conexiones kelly y las juntas torcidas del tubo de perforación, mientras están suspendidas en posición de trabajo, con la ayuda de la grúa. Las conexiones kelly no necesitan quitarse y luego levantarse. No hay que llevarlas a un taller. Se ahorra mucho tiempo en el trabajo de enderezamiento y el peligro de que las piezas se vuelvan a doblar o torcer durante su manipulación se elimina del todo.

En los campos extranjeros, el enderezar estas piezas respresenta un gasto muy subido y una considerable pérdida de tiempo. El taller competente para hacer estos trabajos de enderezamiento puede hallarse muy retirado del campo, lo que dificulta más aún la situación, y cuando no hay piezas de repuesto, se presenta la pérdida de valioso tiempo. Todas estas dificultades pueden evitarse con un enderezador Baker.

ENDEREZAMIENTO DE UNA KELLY

El ENDEREZADOR se levanta fácilmente con una grúa y se coloca en posición vertical encima de la plataforma de la rotativa, como se ve en la figura 40, de la cual se han quitado los soportes de la kelly.

Después de haber extraido todo el tubo perforación, se descubre el punto ladeado o torcido, generalmente con cuerdas apretadas de como la mitad del diámetro de un lapiz colocadas en las caras adyacentes de la kelly. La kelly se baja entonces hasta que el punto de máximo torcimiento quede a una distancia, encima de la plataforma, igual a la del ariete en el enderezador. Esto puede hacerse antes o despues de que el aparato se haya colocado en la plataforma.

Una fuerza suficiente para hacer que la kelly quede en contacto con las piezas separadoras se aplica primero, mediante la bomba hidráulica. La vista superior en la figura 41 muestra los detalles. Una regla se coloca ahora transversalmente al frente de los balancines y se mide ahora la distancia entre este punto y la kelly.

Para determinar la elasticidad de la kelly, se aplica y quita presión varias veces, midiendose cada vez la distancia entre la regla y la kelly. Es importante medir con exactitud esta distancia, para determinar la cantidad de flexión que puede resistir la kelly antes de que llegue al límite de su elasticidad o quede permanentemente torcido o ladeado en una posición fija.

Después de que se haya determinado este límite de elasticidad, todo lo que se requiere es forzar la kelly un punto más alla del que se necesita para enderezarla. A continuación se levanta y se ensaya con cables bien tiesos. Cuando la pieza no retiene su forma, después de haber sido enderezada, unos pocos golpes de martillo, mientras está bajo presión, la dejan en buen estado.

ENDEREZAMIENTO DE TUBO DE PERFORACION

El tubo de perforación se endereza con el separador en posición invertida, tal como se hace para la kelly, y como se muestra en la vista de abajo en la figura 41, y en la figura 42. Se determina el punto de máximo ladeamiento o torcedura, en el tubo de perforación, mientras se gira en la plataforma de la rotativa. El tubo se baja entonces y el punto saliente se marca con tiza mientras el tubo está girando. El paso siguiente es enderezarlo con la máquina.

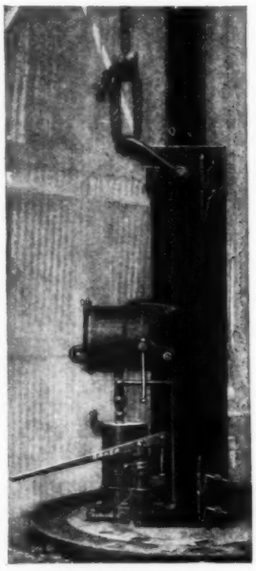

Fig. 40

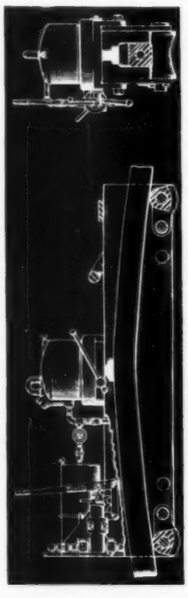

Fig. 41

Fig. 42

BAKER PORTABLE HYDRAULIC KELLY AND PIPE STRAIGHTENER

This very efficient and easily operated device utilizes the principle of the hydraulic ram, applying the force built up by a hand operated pump to any bend in the Kelly, Drill Collar, or Drill Pipe while it hangs suspended in the derrick. It can be readily transported to the well on a small "pickup" truck or trailer and, by means of the catline, is easily set up on the rotary table for operation, as shown in Figure 40.

With this equipment you can secure the many advantages of straightening bent or kinked Kellys or joints of Drill Pipe, as they hang in normal operating position suspended in the derrick. Kellys do not have to be laid down and picked up; they do not have to be transported to a shop; time is saved in the straightening operation; and the danger of again bending during handling is eliminated.

In foreign fields, moreover, the costs of straightening a Kelly or drill pipe and the expense of time thus lost are a serious matter. A shop capable of straightening the Kelly may be far away and difficult to reach, and when a substitute Kelly is not at hand the time lost represents a considerable expense. This can all be avoided by having a Baker Kelly Straightener available.

STRAIGHTENING A KELLY

The STRAIGHTENER is easily picked up with the catline and placed in a vertical position on the rotary table (see Figure 40) from which the Kelly Bushings have been removed.

After all the drill pipe has been pulled, the bent place is located, usually with tight lines about one-half the diameter of a lead pencil, placed on adjacent faces of the Kelly. The Kelly is then lowered until the point of maximum bend is at a distance above the rotary table equal to that of the ram in the Straightener. This can be done either before or after the device has been set up on the table.

Just enough pressure to force the Kelly into contact with the spacer saddles is first applied by use of the hydraulic pump; for details refer to Figure 41, upper view. A straight-edge is placed across the front of the beams and the distance from it to the Kelly is measured.

In order to determine the spring or elasticity of the Kelly, pressure is applied and released several times, with a close measurement each time being made of the distance between the straight-edge and the Kelly. It is important that this measurement be closely watched to determine the amount the Kelly will spring or bend before it will have reached its elastic limit, or have been permanently bent in a set position.

After this elastic limit has been determined, all that is necessary to do is to force the Kelly slightly beyond the point required to bend it straight. It is then raised and tested with taut chalk lines. When Kellys will not retain their shape after being straightened, a few light taps with a hammer while the Kelly is under pressure will overcome the difficulty.

STRAIGHTENING DRILL PIPE

Drill pipe is straightened with the Spacer reversed (as shown in Figure 42 and lower view in Figure 41) in the same manner as a Kelly, by observing to locate the point of maximum bend in the drill pipe while rotating the drill pipe in the rotary table. The pipe should then be lowered and the high point marked with chalk while again being rotated. Then proceed as when straightening a Kelly.

CON EL ENDEREZADOR BAKER SE PUEDE ENDEREZAR CUALQUIERA PIEZA KELLY Y TUBERIA MIENTRAS ESTAN SUSPENDIDAS EN LA GRUA. EL ENDEREZADOR BAKER DE TIPO HIDRAULICO PORTATIL EVITA LAS PARALIZACIONES DEL TRABAJO Y ELIMINA EL PELIGRO DE LADEAR O TORCER DE NUEVO LAS PIEZAS DURANTE SU TRASPORTE A UN TALLER DE REPARACION

YOU CAN STRAIGHTEN DRILL PIPE OR KELLYS WHILE THEY ARE SUSPENDED IN THE DERRICK BY USING THE BAKER PORTABLE HYDRAULIC KELLY AND PIPE STRAIGHTENER. YOU CAN ELIMINATE SHUT-DOWN TIME AND AVOID DANGER OF RE-BENDING WHILE HAULING FROM THE REPAIR SHOP

GUSTOSAMENTE ENVIAREMOS A TODO EXPLOTADOR DE PETROLEO UN EJEMPLAR DE NUESTRO COMPLETO CATALOGO ILUSTRADO. SIRVASE DARNOS SU NOMBRE Y DIRECCION. DIRIJASE TODA CORRESPONDENCIA A NUESTRA OFICINA PRINCIPAL

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ZAPATA SENCILLA BAKER DE REVESTIMIENTO

Estas zapatas, debido a su construcción, establecen nuevas normas de calidad. Sus dimensiones se basan sobre más de treinta años de experiencia en el uso y la manufactura de zapatas de revestimiento. Suministramos esta zapata en una longitud normal de 16 pulgadas, a menos que se indique de otra manera. Véase la figura 43.

Las zapatas sencillas "templadas" Baker, para revestimientos, se hacen de piezas macizas forjadas de acero de patrón 1035 S.A.E. endurecidas a un grado adecuado a su empleo en agujeros perforados con herramientas de cable. Las zapatas "sin templar" se hacen también de piezas forjadas macizas, se emplean generalmente en agujeros perforados con rotativa.

Fig. 43

ZAPATA MODELO BAKER DE REVESTIMIENTO

El fondo de esta eficaz zapata consiste de una serie de cuchillas, como se ve en la figura 44, las cuales cortan una porción de la pared lateral del agujero perforado con herramientas de cable, para que el revestimiento pueda descender con facilidad. Generalmente se evita la necesidad de raspar con escariador, en cuyo caso, el pequeño costo adicional de esta zapata, en comparación con el de una sencilla, se ahorra muchas veces.

Fig. 44

ZAPATA GIRATORIA BAKER (Tipo de diente de sierra)

Se emplea una zapata giratoria generalmente cuando el tubo de perforación queda atascado en el hoyo y es necesario lavarlo. La zapata giratoria Baker de tipo de diente de sierra se hace de acero de alto contenido de carbono, para asegurar un temple profundo y resistente.

GANCHO GIRATORIO DE PARED DE EXPANSION HIDRAULICA

Este equipo se emplea para mover el grupo pescador en el agujero. Es positivo en funcionamiento y tan seguro en funcionamiento que siempre resulta conveniente en los más difíciles trabajos de pescar. El funcionamiento de este gancho de pared no está gobernado por el tamaño del revestimiento o del agujero, debido al principio hidráulico que se emplea para abrir el gancho a la posición requerida, dentro de los límites de su escala de extensión.

El gancho, mostrado en posición extendida, en la figura 47, cae a una posición vertical cuando la presión de la bomba cesa de actuar. Este gancho puede forjarse en cualquiera forma o tamaño deseado, lo que provee una ilimitada escala de aplicaciones útiles.

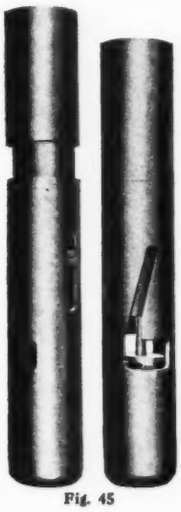


Fig. 45

CUCHARON BAKER

Este cucharon no tiene cadenas, pestillos, resortes ni fondo de émbolo. Las operaciones de cierro y disparo se efectúan mediante un manguito corredizo con salida en el fondo. Esta construcción evita la descarga prematura debido a la resistencia líquida. Esta misma resistencia sirve también para mantener cerrada la válvula mientras el cucharón está en posición suspendida, como se ve en la figura 45 (en la vista de la izquierda). Cuando llega al fondo, el manguito sube por el cuerpo y dispara la válvula, como se ve en la figura 45 (cista de la derecha). El fondo es de construcción muy conveniente, lo mismo que la sección superior.

Fig. 46

Fig. 47

HAY MUCHOS OTROS EXCELENTES PRODUCTOS BAKER DE COMPROBADA EFICACIA PRACTICA

Los siguientes productos se describen e ilustran en el nuevo catálogo general de la Baker, ejemplar del cual enviaremos gustosamente a todo interesado: cañones Baker rotatorios para sacar muestras; el Tapón Baker Sure Shot de cemento para pozos perforados con herramientas de cable; la guía en espiral Baker Yunling (véase la figura 46), empleada para pescar tubos torcidos; el equipo de flotación Baker de hierro fundido; las guías de zapata y tapones sólidos Baker de hierro fundido; el cucharón o limpiador Baker y otras herramientas y accesorios de establecida utilidad práctica, todos los cuales se hallan descritos detalladamente en la sección Baker del catálogo combinado.

BAKER PLAIN CASING SHOE

These shoes are made to established quality standards, with dimensions based upon more than thirty years' experience in the use and manufacture of casing shoes. A standard length of 16 inches is furnished unless otherwise specified; see Figure 43.

"Tempered" Plain Casing Shoes are made from solid punched forgings of S.A.E. 1035 steel, which are hardened to the exact degree best suited for use in cable tool drilled holes. "Untempered" Plain Shoes are likewise made from solid punched forgings, and are ordinarily used in rotary drilled holes.

BAKER PATTERN CASING SHOE

The bottom of this efficient shoe consists of a series of chisels, as shown in Figure 44, which cut off a portion of the side wall of a hole drilled with cable tools, so that the casing may follow easily. The necessity for underreaming is thus frequently eliminated, in which case the slight additional cost of this shoe over the Plain Type is saved many times over.

BAKER ROTARY SHOE (Saw Tooth Type)

A Rotary Shoe usually is employed when the drill pipe becomes frozen or stuck in the hole, and it is necessary to wash down over it. The Saw Tooth Type Baker Rotary Shoe is made from a solid punched forging of high carbon steel which will take a tough, deep temper.

BAKER HYDRAULIC EXPANSION ROTARY WALL HOOK

This device is used to move the "fish" in the hole so that it can be recovered with the fishing tool best suited to the purpose. It is positive in operation, and so safe to use that while it usually is of assistance in difficult fishing jobs, it never makes such jobs more complicated. The operation of this Wall Hook is not governed by the size of the casing or hole, because of the hydraulic principle employed to open the hook to the position required, within the limits of its range of expansion.

The hook, shown in open position in Figure 47, drops to a vertical position when pump pressure is removed. This hook can be forged into any desired shape or size, thus providing an unlimited range of usefulness.

BAKER ALLOY CEMENT DUMP BAILER BOTTOM AND JOINT TOP

This dump bailer has no chains, latches, springs, nor plunger bottom. The locking and tripping operations are performed by means of a sliding sleeve with a vent in the bottom. This design prevents premature dumping due to fluid resistance, such resistance also serving to keep the valve locked while the bailer is in suspended position, as illustrated in Figure 45, (view to the left). When the bailer reaches bottom, the sleeve is forced upward on the body and trips the valve, as shown in Figure 45, (view to the right). The bailer Bottom is made for either flush joint or coupled joint make up. Tops are of the Bail Type and Joint Type.

THERE ARE MANY OTHER PRACTICAL AND DEPENDABLE PRODUCTS

The following products are fully described and illustrated in the large Baker Catalog, which we will be glad to send to any oil man requesting it: Baker Rotary Core Barrels; the Baker Sure Shot Cement Plug for cable tool wells; the Baker Yungling Spiral Guide (see Figure 46) used in fishing for twisted off pipe; Baker Cast Iron Floating Equipment; Baker Cast Iron Shoe Guides and Bull Plugs; the Baker Cleanout Bailer; and other successful devices, all of which also are described in detail in the Baker Section in the Composite Catalog.

Main Office & Plant:
BAKER OIL TOOLS, INC.
Post Office Box 71,
Huntington Park, Calif., U. S. A.

New York Office:
BAKER OIL TOOLS, INC.
Room 1914 — 19 Rector Street,
New York, N. Y., U. S. A.

Gulf Coast Plant and Office:
BAKER OIL TOOLS, INC.
6023 Navigation Boulevard,
Houston, Texas, U. S. A.

Mid-Continent Office & Warehouse:
BAKER OIL TOOLS, INC.
312 East Fourth St.,
Tulsa, Oklahoma, U. S. A.

Oficina principal y fabrica:
BAKER OIL TOOLS, INC.
Post Office Box 71,
Huntington Park, Calif., E. U. A.

Oficina en Nueva York:
BAKER OIL TOOLS, INC.
Room 1914 — 19 Rector St.,
Nueva York, N. Y., E. U. A.

Fabrica y oficina en la costa del Golfo de Mexico:
BAKER OIL TOOLS, INC.
6023 Navigation Boulevard,
Houston, Texas, E. U. A.

Oficina y depósito central:
BAKER OIL TOOLS, INC.
312 East Fourth St.,
Tulsa, Oklahoma, E. U. A.

FOR BAKER SERVICE IN U.S.A. COMMUNICATE WITH THE OFFICE NEAREST TO YOU!

In addition to addresses at right, service is available as follows:

West Texas Branch Office:
Odessa, Texas—Telephone 217

Oklahoma City, Oklahoma:
Tel. 77412—1117 S.E. 29th St.

Rocky Mountain Headquarters:
Tel. 2230—Casper, Wyoming—Box 1464

Wichita, Kansas:
Tel. 3-2539—135 So. Green St.—Box 1875

BAKER

(Continued from Page 161)

erally used with heavy rotary equipment in many fields and economize on fuel and water requirements.

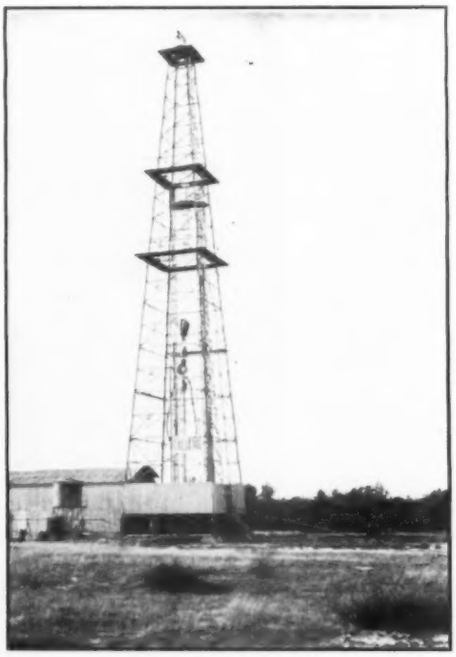
Internal combustion engine powered rotary drilling units are available for the whole range of drilling requirements, giving satisfactory results where properly selected and used.

ENGINE-ELECTRIC DRILLING

Through combination of a system of control called "variable voltage" applied to direct current motors on drilling rigs, and use of internal combustion engines to drive the direct current generators, a power system has been developed for rotary rigs. The prime movers may be electric motors if high line service is available.

Where gas-gasoline engines are used rig speeds vary from 80 to 120 r.p.m. The engines are usually radiator and fan cooled and direct connected to the generator. Each unit is mounted on a skid.

The diesel engines are of the slower speed class operating from 500 to 600 r.p.m. Fuel consumption



Wildcat test

per 24-hour day on a 700-horsepower rig will not exceed 10 bbls. per day for normal drilling. This fuel costs from $1.75 to $2 per barrel. Not more than 3 gallons of lubricating oil are required per day for the entire rig. An enclosed cooling water system is used where the engine jacket water is cooled and requires only a small quantity of make-up water daily.

It is usual practice to use two 350-horsepower, 8-cylinder, 9-inch bore by 12-inch stroke diesel engines running at 600 r.p.m. Each is mounted upon skids and power transmitted to the generators through V-belts. Each engine is equipped with a clutch so one engine may be shut down for repairs or light loads. Engines are equipped with electric alarm to worn operator when water is too hot or lubricating oil pressure too low.

The electric equipment usually consists of one 250 k.w. generator, one 200 k.w. generator and two 20 k.w. direct connected exciters. On the rig there are two 200-horsepower shunt wound drilling motors, twin motor drilling reduction gear, or one 200/400-horsepower, 450/900 r.p.m., 200/400-volt d.c. shunt wound drilling motor. One 300-horsepower shunt wound mud pump motor and one 200-horsepower shunt wound mud pump motor.

(Continued on Page 177)

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Afin de se rendre compte d'une manière tangible des économies nettes de carburant dues à la conservation de la chaleur, on peut supposer qu'un appareillage moyen utilise 100 barils de carburant par jour, puis faire le total des économies réalisées en ajoutant les perfectionnements apportés aux appareillages modernes.

Article—	Carburant économisé (pourcentage)	Carburant utilisé (barils par jour)
Appareillage moyen (sans perfectionnements)	0	100
Réchauffeur d'eau d'alimentation	13	87.0
Surchauffeur	10	78.0
Pompe à dépôts mue par moteur	30	55.0
Rotatif mu par moteur—vapeur économisée 20 pour cent sur appareillage régulier—30 pour cent de la vapeur totale fournie à l'appareillage et employée par le moteur élévatoire égale 0,20x0,30	6	51,5
Isolement de chaudière et conduite de vapeur	20	41.0

LES MOTEURS A COMBUSTION INTERNE

Les moteurs Diesel sont maintenant d'un emploi commun, soit pour commande directe par l'entremise d'un contrôle à embrayage et arbre intermédiaire, soit reliés directement à des générateurs de courant alternatif ou de courant continu pour des groupes-force destinés aux fonctionnement des appareillages de forage rotatif. Ces groupes-force conviennent tout particulièrement aux régions où le combustible et l'eau sont coûteux.

On a réalisé des groupes portatifs qui emploient des moteurs à essence comme groupes-moteurs, et qui sont à même de forer un trou rotatif de 6 pouces de diamètre et 4000 pieds de profondeur. La facilité pour appareiller, pour démonter l'ensemble et pour se rendre d'un endroit à un autre sont autant d'avantages qui ont rendu ces groupes populaires et économiques dans de nombreuses régions où il est nécessaire de faire des essais de forage.

Les groupes-moteurs Diesel, plus lourds, sont plutôt employés avec le matériel rotatif pesant sur de nombreux champs pétrolifères et se traduisent par des économies de combustible et d'eau.

Les groupes de forage rotatif actionnés par moteur à combustion interne peuvent s'obtenir pour toute la gamme des besoins de forage, donnant dans chaque cas entière satisfaction lorsqu'on sélectionne et utilise le type approprié.

FORAGE ELECTRIQUE A MOTEURS A COMBUSTION INTERNE

Par la combinaison d'un système de commande appelé "à voltage variable" appliqué aux moteurs de courant continu sur les appareillages de forage, et l'emploi de moteurs à combustion interne pour actionner les générateurs de courant continu, on a réalisé un système de force motrice pour les appareillages de forage rotatif. Les groupes moteurs peuvent être des moteurs électriques si l'on désire un service de haute efficacité.

Lorsqu'on a recours à des moteurs à gaz-essence, les vitesses de l'appareillage de forage pourront varier de 80 à 120 t/m. Les moteurs sont en général refroidis au moyen d'un radiateur ou d'un ventilateur, et reliés directement au générateur. Chaque groupe est monté sur un patin.

(Continué sur Page 177)

(Continué de Página 161)

Para reducir la conservación del calor a definidos ahorros de combustible, puede asumirse que la instalación promedia usa 100 barriles de combustible al día, y calcular acumulativamente el ahorro agregando los adelantos a las instalaciones presentes.

Partidas—	Combustible ahorrado (porcentaje)	Combustible usado (barriles por día)
Instalación promedia, sin los adelantos	0	100
Calentador de agua de alimentación	13	87
Recalentador	10	78
Bomba de cieno accionada por motor	30	55
Máquina rotativa accionada por motor — vapor ahorrado, 20% sobre la instalación corriente—30% del vapor total usado por la máquina izadora, equivalente a 0,20 x 0,30	6	51,5
Aislamiento de caldera t tubería de vapor	20	41

MOTORES DE COMBUSTION INTERNA

Los motores diésel se emplean ahora mucho para transmisión directa, mediante contraeje y gobierno de embrague, o en acoplamiento directo con generadores de corriente contínua o alterna, para el funcionamiento de aparejos de perforación rotatoria. Estos motores se adaptan muy bien a lugares donde el combustible y el agua son caros.

Se han desarrollado equipos portátiles, provistos de motores de gasolina, con capacidad para perforar, por el sistema rotativo, un agujero de 6" de 4.000 pies. La facilidad en la instalación, desmontaje y transporte de un punto a otro, hace que estos equipos sean populares y económicos en lugares donde se hacen perforaciones de ensayo.

Los motores diésel más grandes tienen creciente aceptación para el funcionamiento de los equipos de perforación de alta capacidad, en muchas explotaciones, a causan de que son económicos en combustible y agua.

Hay máquinas de perforación rotatoria, accionadas por motores de combustión o explosión interna, para todo requisito de perforación corriente, que dan excelentes resultados, cuando son elegidas y utilizadas en debida forma.

PERFORACION ELECTRICA CON MOTORES DE COMBUSTION INTERNA

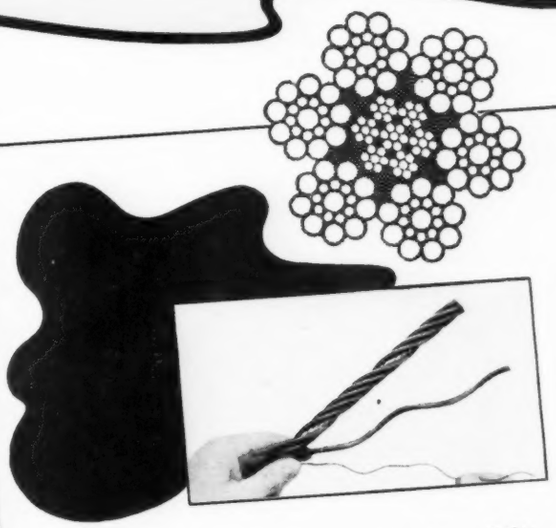
Mediante la combinación de un sistema de control llamado "de voltaje variable, aplicable a los motores de corriente contínua de los aparejos de perforar, y el empleo de motores de combustión interna, para accionar los generadores de corriente contínua, se ha establecido un nuevo sistema de fuerza motríz para los aparejos de perforación rotativa. Los grupos motores pueden ser todos eléctricos cuando hay abundante abastecimiento de corriente.

Cuando se emplean motores de gas o de gasolina, las velocidades del aparejo de perforación varían de 80 a 120 revoluciones por minuto. Los motores son generalmente enfriados mediante un radiador o un ventilador, y acoplados directamente al generador. Cada grupo completo va montado sobre un patín.

(Continué en Página 177)

MACWHYTE

PREformed Wire Lines



Special construction increases flexibility . . . reduces fatigue caused by high-speed bending . . . assures maximum service

Une fabrication spéciale augmente la flexibilité . . . réduit la fatigue causée par le pliage à grandes vitesses . . . assure un service maximum

Su construcción especial aumenta la flexibilidad . . . reduce el desgaste causado por el contínuo doblar y estrechar a alta velocidad . . . y asegura duración máxima

For the punishing requirements of rotary drilling, Macwhyte recommends Monarch Whyte Strand *PRE*formed Rotary Line.

This special line is made of tough wire which gives great resistance to fatigue and abrasion.

Every wire and strand in this line is *PRE*formed. The result is a minimum of internal stress and friction which allows the line to bend easily over sheaves and wind evenly on drums.

Macwhyte manufactures many specially designed wire lines for the oil fields—including swabbing lines, casing lines, tow lines, tubing lines, winch ropes, sucker rod lines, fall lines.

Distributors throughout the U. S. oil fields. Warehouse at Texas and Pacific Terminal Building, Fort Worth, Texas.

Pour répondre aux conditions sévères du travail au "Rotary" Macwhyte recommande son câble spécial "Monarch Whyte Strand *PRE*formed Rotary Line".

Ce câble est composé de fils offrant une très grande résistance à la fatigue et à la corrosion.

Chaque fil de ce câble est préalablement mis en forme. Il en résulte un minimum de tensions et de frictions intérieures, ce qui permet au câble de se plier aisément sur les poulies à gorges et de s'enrouler régulièrement sur les tambours.

Macwhyte fabrique toute une variété de câbles, spécialement étudiés pour répondre aux différents besoins de l'industrie du pétrole.

Ecrire à Macwhyte Company, Kenosha, Wisconsin, U. S. A. pour obtenir le nom de l'Agent le plus proche qui pourra vous fournir tous renseignements utiles.

Para los árduos requisito de perforación al sistema rotatorio, Macwhite recomienda los cables Monarch Whyte Strand *PRE*formed.

Estos cables de construcción especial están fabricados con un alambre fortísimo que hace difícil el romperse con el torcimiento y la fricción.

A cada alambre y cordón de este cable se le ha dado la forma sin torcer. Este procedimiento ha dado por resultado una resistencia interna máxima que permite doblar fácilmente el cable sobre las poleas y facilita una envoltura uniforme en los tambores.

Macwhyte especializa en la construcción especial de una variedad de cables, entre los que pueden citarse aquéllos para rehabilitación de pozos, para tubería de perforación, para remolques, para instalación de tubos, para grúas, y para varillas de bomba.

Para informes sobre las agencias más cercanas, diríjase a The Macwhyte Company, Kenosha, Wisconsin, E. U. A.

MACWHYTE COMPANY, KENOSHA, WIS., U. S. A.

A VALVE FOR EVERY PURPOSE

Whether the application calls for large or small flow . . . high or low temperature and pressure . . . Walworth provides the proper Valve and Fitting for any and every purpose. For hard service in exposed places, the Walworth Fig. 709 Saddle Gate Valve is ideal in the oil country. This valve combines simplicity and compactness with durability, and insures a truly economical performance.

UNE VANNE POUR CHAQUE USAGE

Que l'application envisagée demande un écoulement abondant ou non . . . une pression ou une température élevée ou basse . . . Walworth a prévu la vanne et la garniture appropriées à chaque usage, quel qu'il soit. Pour service dur aux endroits exposés, la vanne Walworth à selle Fig. 709 est l'idéal en service pétrolier. Cette vanne joint la simplicité et la compacité à la durabilité, et se distingue par un fonctionnement des plus économiques.

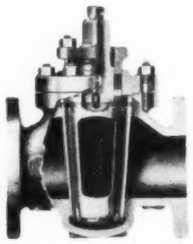
UNA VALVULA PARA CADA REQUiSITO

Que la aplicación proyectada exija un flujo grande o uno pequeño . . . una presión o una temperatura elevada o baja . . . la Walworth ofrece la válvula y los accesorios para satisfacer todo requisito, no importa cual sea. Para trabajos pesados en lugares a la intemperie, la válvula de compuerta Walworth No. 709 es la ideal para el servicio petrolero. Esta válvula combina sencillez, tamaño conveniente y gran duración, y se distingue por un funcionamiento extraordinariamente económico.

For general plant service where throttling is not required Fig. 95 is ideally adapted. Made to withstand 150 lb. working pressure.

En service général à la fabrique, où l'étranglement n'est pas exigé, le type de la Fig. 95 est admirablement adapté. Prévue pour résister à une pression de travail de 150 lbs.

Para servicio general de fábrica, donde no se requiere estrangulación, el tipo ilustrado en la figura 95 resulta sumamente adecuado. Calculado para resistir una presión de trabajo de 150 libras.



The Walworth Lubricated Plug Valves give a tight shut-off on substances difficult to hold and where leaks are hazardous or costly.

Les soupapes lubréfiées Walworth à siege conique assurent une fermeture serrée en présence do substances difficiles à enfermer et dans les cas où les fuites sont risquées ou coûteuses.

Las válulas lubricadas Walworth de asiento cónico aseguran un cierre hermético, en presencia de substancias dificiles de cerrar, y en aquellos casos en que los escapes son peligrosos o costosos.

For plant service requiring throttling Walworth Fig. 245-P Nickel Alloy Plug Type Disc and Seat, made to withstand 200 lb. working steam pressure, will take terrific punishment and last longer.

Prévus pour service en fabrique demandant l'étranglement, le disque et siège du type à cône en alliage au nickel Walworth Fig. 245-P, étudiés pour résister à une pression de vapeur en service de 200 lbs., peuvent supporter beaucoup et durer longtemps.

Para el servicio de establecimientos que exigen control de estrangulación, la válvula Walworth, figura 245-P, de disco y asiento de tipo de cono, de aleación de níquel, especial para resistir una presión de vapor de 200 libras, resiste muy bien el trabajo y dura mucho tiempo.

WALWORTH

VALVES FITTINGS and TOOLS
Backed by 94 Years' Service

WALWORTH COMPANY
60 EAST 42nd STREET, NEW YORK

DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

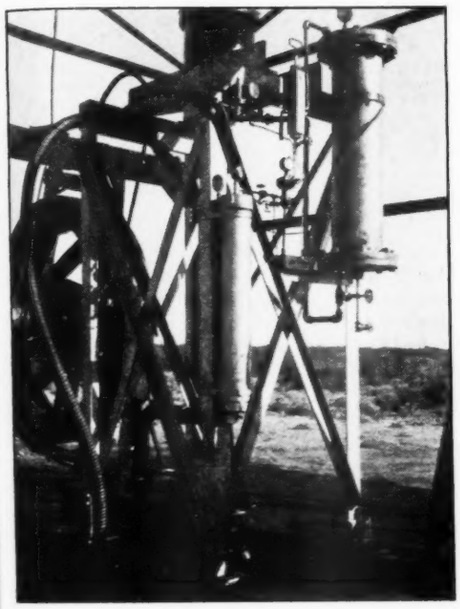
(Continued from Page 174)

With this system of generators, motors, and controllers a balanced rig is provided, easily manipulated and comparable with the flexibility of steam rotary drilling equipment.

PRESSURE CONTROL

While the rotary is most generally used there are many areas where cable tools are used because of shallow depths. Rotary equipment has tended toward heavier machinery and use of better steel. There has been marked development in pressure control drilling with the advantage of drilling formations without applying high pressures incident to long fluid columns. The engineers recognize these advantages for drilling low-pressure formations, although pressure drilling was first developed to combat conditions set up by penetration of high-pressure zones.

While there are special methods for control of wells drilled into high- or low-pressure formations many operators are rigging up with standard equipment at the well head and have simplified



Pump control

mechanical details. With some knowledge of the pressures to be encountered through various formations contractors are taking advantage of it to control pressures exerted against those formations. The main desire is to maintain drilling pressures so the differential in pressure will be in favor of the formation and permit gas or oil to enter the hole freely and keep the pores of the sand free from contamination.

Pressure control drilling is being utilized in many fields to overcome the tendency of heavy mud to seal off upper producing sands which may be produced later. This requirement has arisen through attempting to bring into production upper formations passed up and found to be definitely sealed off. In limestone formations production may be regained by applying hydrochloric acid to open the pores and some so-called "mud solvents" have been tried in sand formations sealed with old rotary mud. One way is to impregnate the mud with limestone which can be removed by hydrochloric acid. There are some disadvantages in adding an inert material like limestone to drilling mud but they do not entirely offset many advantages gained by use of limestone impregnated muds.

Another advancement is control of direction of hole both as to verticality and azimuth. Some times it is desirable to divert a hole from a true vertical path to reach some producing formation

(Continued on Page 185)

(Continué de Page 174)

Les moteurs Diesel sont du type à faibles vitesses de 500 à 600 tours à la minute. La consommation de carburant par 24 heures sur un appareillage de forage de 700 CV ne dépassera pas 10 barils par jour pour un forage normal. Ce carburant revient de $1,75 à $2.00 le baril. On n'a pas besoin de plus de trois gallons d'huile de graissage par jour pour l'appareillage entier. On a recours à un système fermé de refroidissement à eau dans les cas où l'eau de la chemise du moteur est refroidie, de sorte qu'on a seulement besoin d'une petite quantité d'eau à se procurer chaque jour.

La pratique courante est d'employer deux moteurs Diesel de 350 CV à 8 cylindres, de 9 pouces d'alésage sur 12 pouces de course, fonctionnant à 600 t/m. Chacun d'eux est monté sur patins et la force est transmise aux générateurs par le moyen de courroies trapézoïdales. Chaque moteur est muni d'un embrayage, de sorte qu'on peut arrêter un moteur à la fois pour réparations ou charges légères. Ces moteurs sont équipés d'une sonnerie électrique destinée à prévenir l'opérateur lorsque l'eau est trop chaude ou lorsque la pression d'huile de graissage est trop faible.

L'équipement électrique consiste en général d'un générateur de 250 KW, d'un générateur de 200 KW et deux excitateurs de 20 KW reliés directement. Sur l'appareillage de forage, il y a deux moteurs de forage de 200 CV excités en dérivation, un engrenage démultiplicateur de forage pour moteurs jumeaux, ou un moteur de forage excité en dérivation de 200/400 CV, 450/900 t/m et 200/400 CC. Un moteur de pompe à boues de 300 CV excité en dérivation, et un moteur de pompe à boues de 200 CV également excité en dérivation.

Au moyen de ce système de générateurs, de moteurs et de contrôleurs, on réalise un appareillage équilibré, de manoeuvre facile et d'une souplesse comparable à celle du matériel de forage rotatif à la vapeur.

CONTROLE DES PRESSIONS

Bien que le matériel dit rotatif soit le plus couramment employé, il existe de nombreuses régions où on fait usage des outils sur câble à cause des faibles profondeurs. Le matériel rotatif a tendu à employer des machines plus pesantes et de meilleures qualités d'acier. Il y a eu un progrès marqué d'accompli dans le forage à contrôle de pression, qui a l'avantage de forer des formations sans l'application des fortes pressions présentes dans le cas des longues colonnes de liquides. Les ingénieurs reconnaissent ces avantages pour le forage des formations de faible pression, bien que le forage à pression ait été perfectionné tout d'abord pour combattre les conditions à surmonter pour la pénétration des zones à pressions élevées.

Bien qu'il existe des méthodes spéciales pour contrôler les puits forés dans des formations à pressions faibles ou à pressions élevées, un grand nombre exploitants pétroliers appareillent avec du matériel standard à la tête du puits et ont simplifié bien des détails mécaniques. Possédant quelque connaissance des pressions qu'ils doivent s'attendre à rencontrer à travers les diverses formations, les exploitants de gisements en tirent parti pour contrôler les pressions à exercer contre ces formations. Le but principal qu'on vise est de maintenir les pressions de forage de telle manière que la différence de pression reste en faveur de la formation, permettant ainsi au gaz ou au pétrole d'entrer librement dans le puits, tout en maintenant les pores du sable exempts de toute contamination.

Le forage avec contrôle des pressions est appliqué dans de nombreux champs pétrolifères pour se rendre maitre de la tendance manifestée par les boues lourdes d'enmurer les sables producteurs supérieurs qui peuvent être extraits ultérieurement.

(Continué sur Page 185)

(Continué de Página 174)

Los motores diésel son del tipo de baja velocidad, con velocidades de 500 a 600 revoluciones por minuto. El consumo de combustible, durante 24 horas, para un aparejo de taladrar de 700 c. de f., no pasa de 10 barriles por día, para una perforación normal. Este combustible cuesta de $1,75 a $2,00 el barril. No hay necesidad de más de tres galones de aceite lubricante al día para el aparejo completo. Se emplea un sistema cerrado de enfriamiento por agua, cuando el agua de la camisa o canalización del motor sirve de medio de enfriamiento, de modo que hay necesidad de sólo una pequeña cantidad de agua para los requisitos del trabajo diario.

La práctica corriente es emplear dos motores diésel de 350 c. de f., de 8 cilindros, con diámetro interior de 9 pulgadas y carrera de émbolo de 12 pulgadas, que funcionan a razón de 600 revoluciones por minuto. Cada uno va montado sobre patín y la fuerza es transmitida a los generadores por medio de correas trapezoidales. Cada motor está provisto de un embrague, lo que permite parar un motor para su reparación o moderar su velocidad para cargas livianas. Estos motores llevan un sistema eléctrico de advertencia sonora, que sirve para informar al operario cuando el agua está demasiado caliente o cuando es demasiado baja la presión del aceite lubricante.

El equipo eléctrico consta, en general, de un generador de 250 kilovatios, un generador de 200 kilovatios y dos excitadores de 20 kilovatios de acoplamiento directo. Sobre el aparejo de taladrar, hay dos motores de perforación de 200 c. de f. de arrollamiento en derivación, un aparato de desmultiplicación de perforación para los motores gemelos, o un motor de perforación de arrollamiento en derivación de 200 a 400 c. de f., de 450 a 900 r.p.m. y de 200 a 400 voltios de corriente contínua. La instalación se completa con un motor de bomba de barro o cieno de 300 c. de f. excitado en derivación y un motor de bomba de barro de 200 c. de f. igualmente excitado en derivación.

Mediante este sistema de generadores, motores y reguladores, se estable un aparejo de taladrar bien equilibrado, de maniobra fácil y de una flexibilidad comparable a la de un equipo de perforación rotativa a vapor.

CONTROL DE LA PRESION

A pesar de que el equipo rotatorio es el de uso más generalizado, hay, sin embargo, muchos lugares en que se emplean herramientas de cable, debido a las limitadas profundidades de los pozos. El equipo rotatorio ha tenido la tendencia hacia maquinaria más pesada y el empleo de mejor acero. Ha habido un notable desarrollo en el control de la presión de la perforación, con la ventaja de que se puede ahora perforar una formación sin necesidad de aplicar altas presiones para sobreponerse a grandes presiones líquidas. Los ingenieros reconocen estas ventajas para la perforación de formaciones de baja presión, a pesar de que la perforación bajo presión fué al principio desarrollada para combatir las condiciones provocadas por la penetración de zonas de alta presión.

A pesar de que hal métodos especial para el control de pozos perforados en formaciones de alta o de baja presión, muchos explotadores están instalando equipo normal en los pozos y han simplificado mucho los detalles mecánicos. Contando con cierto conocimiento de las presiones que se presentarán en las varias formaciones, los contratistas aprovechan esta información para regular las presiones ejercidas sobre estas formaciones. El deseo general es mantener presiones de perforación de modo que el diferencial en presión quede a favor de la formación y permita que el gas o el petróleo entre fácilmente en el agujero, conservando los poros de la arena exentos de contaminación.

(Continué en Página 185)

THE JOHNSTON TESTER

THE PURPOSE OF THE JOHNSTON FORMATION TESTER

The Formation Tester is a device used for testing the contents and productivity of zones encountered in a drilling well without the expense and loss of time in cementing casing. It is also adapted to the use of testing the effectiveness of a water shut-off on cemented casing and can save the operator considerable time and money over the old system of bailing.

THE PRINCIPLE OF THE JOHNSTON TESTER

The principle of the Johnston Formation Tester is one of simplicity and accuracy. It relieves the zone which is to be tested, of the hydrostatic pressure of the column of drilling fluid which is present in the hole, and opens it to atmospheric pressure. In other words, it bails the hole dry in an instant.

APPLICATION OF PRINCIPLE

The Johnston Formation Tester is composed of a series of valves, each having a separate and distinctive purpose. The tester is assembled as a unit and connected to the bottom of the drill pipe. A packer (the type depending upon the kind of test to be made) is connected to the bottom of the tester, and the tools thus assembled are run into the hole on the empty or partially empty drill pipe. When the zone to be tested is reached, the packer is set and valves (all of which are definitely controlled by the operator) are opened. The zone being relieved of the hydrostatic pressure of the drilling fluid by action of the packer, is free to produce through the drill pipe under its own pressure.

The Johnston Formation Tester enables operators to test every formation easily, quickly, and at a nominal expense. For years the Johnston Tester has been giving operators definite information as to the contents of the various formations penetrated in the course of drilling a well. Now that drilling has gone to 10,000 feet and average new production is below the mile mark, it is more important than ever that you know what your pay possibilities are before setting a costly string of pipe.

The Johnston Tester eliminates old-fashioned bailing methods for testing water shut-offs — takes accurate samples of fluid from any desired formation in cased or uncased holes —differentiates between a test and a drill pipe leak—provides perfect safety to men and equipment in running each test.

Easy removal of the tester from the well is accomplished by means of the patented equalizing valve which relieves all excessive strain from the derrick when the string is lifted off bottom. Don't take a chance—use a Johnston Tester.

Operating a Johnston Formation Tester is as simple and safe as running a bit or core barrel. The valve mechanism is automatic. There is no turning or twisting the drill stem to open or close a Johnston Tester. Turning a long string of drill stem to open or close a valve at the bottom of a well is obviously uncertain and unreliable. The Johnston Tester opens by the weight of the drill stem and closes automatically the instant the weight of the drill stem is lifted. The trip valve on the Johnston Tester is further guarantee of a dry drill stem until the operator is ready to test the formation.

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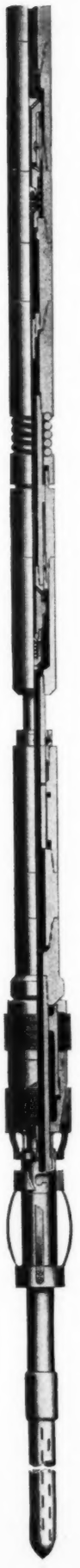

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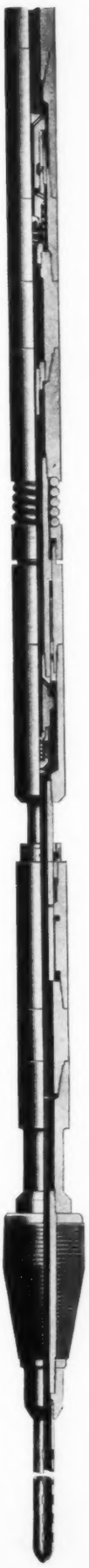

L'OBJET DE L'ESSAYEUR DE FORMATIONS JOHNSTON

L'essayeur de formations est un dispositif s'emploie pour déterminer la richesse et la productivité des zones rencontrées dans un puits de forage sans les frais et la perte de temps entrainés par la cémentation d'un revêtement. Il est aussi adapté à l'essai d'efficacité d'un obturateur d'eau sur un revêtement cimenté et peut économiser à l'ouvrier foreur bien du temps et de l'argent par rapport à l'ancien système de l'écoppage.

LE PRINCIPE DE L'ESSAYEUR JOHNSTON

Le principe de l'essayeur de formations Johnston est à la fois simplicité et précision. Cet instrument libère la zone à essayer de la pression hydrostatique de la colonne de fluide de forage qui est présente dans le puits, et l'ouvre à la pression atmosphérique. En d'autres termes, il écoppe le trou en un clin d'oeil le séchant complètemente.

APPLICATION DU PRINCIPE

L'essayeur de formations Johnston se compose d'une série de soupapes, chacune d'elles ayant une fonction séparée et distincte. Cet essayeur est monté pour former une unité complète et est relié au tuyau de forage, à sa base. Une garniture (dont le type dépend du genre d'essai qu'on a en vue) est reliée à la base de l'essayeur, et les outils ainsi montés sont descendus dans le puits sur le tuyau de forage vide ou partiellement vide. Lorsqu'on atteint la zone qu'on désire essayer, on pose la garniture et on ouvre les soupapes (qui sont toutes commandées directement par l'opérateur). La zone se trouvant ainsi libérée de la pression hydrostatique du fluide de forage par l'action de la garniture, est à même de produire par le tuyau de forage sous sa propre pression.

L'essayeur de formations Johnston permet aux exploitants d'essayer toute formation facilement, rapidement et à peu de frais. Depuis des années l'essayeur Johnston a fourni des données précises aux ouvriers foreurs sur la richesse des diverses formations pénétrées au cours du forage d'un puits. Maintenant que les forages atteignent 10.000 pieds et la production nouvelle moyenne dépasse le mille de distance, il devient d'une importance capitale pour vous de déterminer les possibilités d'exploitation lucrative avant de faire l'installation coûteuse d'un faisceau de tubage.

L'essayeur Johnston élimine les méthodes démodées d'écoppage pour verifier les obturations d'eau—prélève des échantillons précis de fluide de toute formation désirée dans des puits munis de revêtement ou non, établit la différence entre un essai et une fuite de tuyau de forage—assure entière sécurité au personnel et au matériel lors de chaque essai.

L'extraction facile de l'essayeur du puits s'effectue au moyen de la soupape équilibreuse brevetée qui soulage le derrick de toute fatigue excessive lorsqu'on soulève le faisceau du fond. Ne courez pas de risques—faites usage de l'essayeur Johnston.

La manoeuvre d'un essayeur de formations Johnston est aussi simple et aussi peu dangereuse que celle d'un trépan de forage ou d'un baril carottier. Le mécanisme de soupape en est automatique. Il n'y a pas à tourner ou à tordre la tige de forage afin d'ouvrir ou de fermer l'essayeur Johnston. On peut bien penser que l'opération qui consisterait à tourner un long faisceau de tige de forage afin d'ouvrir ou de fermer une soupape au fond d'un puits serait incertaine et aléatoire. L'essayeur Johnston s'ouvre par le poids de la tige de forage et se ferme automatiquement dès qu'on allège la tige de forage. La soupape déclic sur l'essayeur Johnston est une garantie de plus d'une tige de forage sèche jusqu'à ce que l'ouvrier foreur soit prêt à essayer la formation.

EL OBJETO DEL ENSAYADOR DE FORMACIONES JOHNSTON

El ensayador de formaciones es un instrumento que se emplea para determinar la riqueza y la productividad de las zonas encontradas en un pozo de perforación, sin los gastos y la pérdida de tiempo ocasionados por la cementación de un revestimiento. También se adapta al ensayo de la efectividad de un obturador de agua en un revestimiento cementado y puede ahorrar al perforador mucho tiempo y dinero, en comparación con el antiguo sistema de achicamiento.

EL PRINCIPIO DEL ENSAYADOR JOHNSTON

El principio del ensayador de formaciones Johnston es, a la vez, muy sencillo y preciso. Este instrumento libra a la zona por ensayarse, de toda la presión hidrostática de la columna de líquido de perforación, que se halla presente en el pozo, exponiéndola a la presión atmosférica. En otros términos, achica todo el líquido del agujero, dejándolo seco en muy poco tiempo.

APLICACION DEL PRINCIPIO

El ensayador de formaciones Johnston se compone de una serie de válvulas. Cada válvula tiene una función separada y distinta. Este ensayador se monta formando un solo grupo completo, y se conecta al fondo del tubo de perforación. Un obturador, cuyo tipo depende de la clase de ensayo que va a realizarse, se une a la base a fondo del ensayador. Todas las herramientas así montadas se bajan por el pozo, por dentro del tubo de perforación vacío o parcialmente vacío. Cuando se llega a la zona que se desea ensayar, se fija el obturador y se abren las válvulas, las cuales son todas accionadas por el operario. La zona bajo ensayo queda así libre de la presión hidrostática del flúido de perforación, debido a la acción del obturador, y queda también preparada para producir por el tubo de perforación, bajo su propia presión.

El ensayador de formaciones Johnston permite a los explotadores ensayar cualquier formación con suma facilidad, rapidez y a poco costo. Desde hace años, el ensayador Johnston ha suministrado datos precisos a los perforadores de pozos, acerca de la riqueza de las diversas formaciones penetradas en el curso de la perforación de pozos. Ahora que las perforaciones han llegado hasta 10.000 pies de profundidad y que la producción nueva promedia queda a menos de una milla de distancia, se presenta como algo de capital importancia para todos los explotadores el determinar primero las posibilidades de explotación lucrativa antes de proceder a la instalación de un costoso sistema de tubería.

El ensayador Johnston elimina los antiguos métodos de achicamiento para verificar las obturaciones de agua, obtiene muestras precisas del flúido de toda formación deseada en pozos provistos de revestimiento o sin éste, establece la diferencia entre un escape de tubo de ensayo y tubo de perforación y asegura completa seguridad al personal y al material durante cada ensayo.

La extracción fácil del ensayador del pozo se efectúa mediante una válvula compensadora patentada, la cual libra al aparejo de grúa de todo esfuerzo excesivo durante el levantamiento de la tubería del fondo. No corra Ud. mingún riesgo innecesario! Válgase de la ayuda del ensayador Johnston.

El manejo de un ensayador de formaciones Johnston es tan fácil y tan segura como la de una barrena de perforación o de un tubo o cañon para sacar muestras. Su mecanismo de válvulas es completamente automático. No hay necesidad de girar o torcer el vástago de perforación para abrir o para cerrar el ensayador Johnston. El girar una larga cuerda de vástago de perforación, para abrir o cerrar una válvula al fondo de un pozo es, por supuesto, una acción incierta o de dudoso resultado. El ensayador Johnston se abre por el mismo peso del vástago de perforación y se cierra automáticamente tan pronto como se le quita el peso de este vástago. La válvula de disparo del ensayador Johnston es una guarantía adicional de un vástago de perforación seco hasta que el obrero esté listo para ensayar la formación.

★

THE JOHNSTON TESTER

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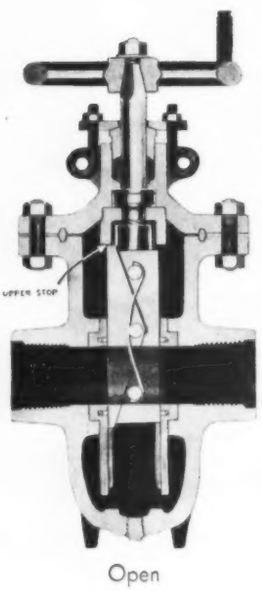
W-K



Open

THROUGH-CONDUIT LUBRICATED GATE VALVE

Through-Conduit opening results in no restriction of flow, and seat faces are not exposed to pressure or abrasion while in service. Should any sediment be carried down with gate, it is automatically washed out when valve is opened. Smaller area is exposed to pressure, confining flow to minimum space.

Body serves as grease chamber, in which all moving parts are entirely submerged in grease. (W-K-M 3" Valve holds 8 lbs. of grease, providing ample lubrication for a long period.) Extraordinary ease of opening and closing is assured by such lubrication.

Parallel gates expand uniformly under all conditions, and double wedge construction assures positive seal-off on both sides in either open or closed position.

Patented bronze combination wipe-and-seal rings, in constant contact with gate, keep gate and seats free from deposits, cleaning at each operation of valve. Bronze seats, extra large, are quickly renewable.

VANNE LUBREFIEE DE CONDUITE ININTERROMPUE

L'ouverture de conduite ininterrompue a pour résultat que l'écoulement n'est aucunement gêné et que les surfaces des sièges ne sont pas exposées à la pression ou à l'abrasion en cours de service. Si jamais un sédiment vient à être entraîné par la vanne, il se trouve automatiquement débarrassé lors de l'ouverture de la soupape. Une surface réduite se trouve exposée à la pression, ce qui limite l'écoulement à un espace minimum.

Le corps sert de chambre à graisse, dans laquelle tous les organes mobiles sont entièrement submergés dans la graisse. (La soupape W-K-M de 3 pouces a une contenance de 8 lbs. de graisse, ce qui assure un graissage amplement suffisant pendant une longue période de temps). Ce type de graissage assure une facilité remarquable pour ouvrir et fermer.

Les portes parallèles de la vanne dilatent uniformément dans toutes les conditions, et un dispositif à double clavette assure une étanchéité positive sur les deux côtés tant à la position ouverte qu'à la position fermée.

Des segments brevetés en bronze, combinaison racleurs et d'étanchéité, en contact constant avec la vanne, maintiennent la vanne et les siéges exempts de dépôts, se chargeant de nettoyer à chaque fonctionnement de la soupape. Les sièges, en bronze, extra-grands, se remplacent promptement.

VALVULA DE TIPO DE COMPUERTA, LUBRICADA, DE PASO RECTO

La abertura de paso recto no ofrece ninguna restricción a la corriente y las caras de los asientos no quedan expuestas a presión o desgaste durante el servicio. Todo sedimento alojado al cerrarse la compuerta es lavado automáticamente al abrirse de nuevo la válvula. La menor superficie expuesta a presión confina la corriente a un espacio mínimo.

El cuerpo sirve de cámara de grasa, en la cual están sumergidas todas las piezas de movimiento. (La válvula W-K-M de 3" tiene cabida para 8 libras de grasa, asegurando amplia lubricación por un largo período de tiempo.) Semejante lubricación permite cerrar y abrir la válvula con suma facilidad.

Las compuertas paralelas se extienden uniformemente, bajo toda condición, y la construcción de doble cuña asegura un cierre positivo en ambos lados, tanto en posición abierta como en posición cerrada.

Los anillos de combinación de limpieza y cierre, de bronce, protegidos por patente, en constante contacto con la compuerta, mantiene la compuerta y los asientos exentos de depósitos, limpiándolos cada vez que la válvula funciona. Los asientos de la válvula, de gran tamaño, pueden renovarse fácilmente.

PORTABLE DRILLING RIG

The W-K-M Portable Drilling Rig is the only complete, self-contained drilling rig which is absolutely portable in every sense of the word. If you are looking for an improvement in modern drilling units, you will be interested in investigating this rig. It is built in sizes for all depths from shot holes to 6,500 feet. There's a size and type for any depth or requirement, but a special type or size will be built to meet your own specifications.

With this new, yet proven, portable drilling unit, you move from one location to another 45 miles per hour. You eliminate the several days of setting up and dismantling time required with conventional drilling rigs.

A number of these units are now being successfully used by drilling contractors and operating companies.

Complete details will be furnished upon request.

APPAREILLAGE DE FORAGE PORTATIF

L'appareillage W-K-M de forage, du type portatif, est le seul équipement de forage complet et autonome sur le marché qui soit rigoureusement portatif dans le sens strict de ce mot. Si vous êtes en quête d'un perfectionnement en matière de groupes de forage moderne, vous serez intéressé à vous renseigner au sujet de cet appareillage. Il est prévu en tailles pour toutes les profondeurs, depuis les trous carottiers jusqu'à concurrence de 6.500 pieds. On a prévu une taille et un type pour chaque profondeur ou chaque cas particulier, mais vous pouvez aussi faire construire un type ou une taille répondant à des spécifications fournies par vous.

Grâce à cet appareillage portatif de forage, nouveau et pourtant démontré, vous pouvez vous déplacer d'un endroit à un autre à raison de 45 milles à l'heure. Vous éliminez ainsi la perte de temps de plusieurs jours demandés par les opérations de montage et de démontage des appareillages de forage courants.

Un certain nombre de ces groupes sont dès maintenant employés avec succès par les entrepreneurs de forage et les compagnies exploitantes.

Détails complets sur demande.

APAREJO DE TALADRAR PORTATIL

El aparejo de taladrar portátil W-K-M es el único que es completo, en todo sentido, y al mismo tiempo absolutamente portátil. Si Ud. se interesa en la última palabra en aparejo de taladrar portátil, le conviene informarse a fondo del presente. Se ofrece en todo tamaño, para toda profundidad de pozo, hasta de 6.500 pies. Hay un tamaño y un tipo para cualquiera profundidad o requisito. Fabricamos también tipos y tamaños especiales para satisfacer necesidades especiales.

Con este nuevo equipo de taladrar portátil, de demostrada utilidad, se puede Ud. trasladar de un punto a otro a 45 millas por hora. Con este equipo se evitan los muchos días que se gastan en la instalación y el desmontaje del aparejo de taladrar de tipo corriente.

Gran número de estos modernos equipos se están empleando con éxito por importantes contratistas de perforación y empresas explotadoras.

Información detallada a solicitud.

W-K-M Portable Drilling Rig with Folding Mast Raised

L'appareillage de forage portatif W-K-M avec pylone pliable dressé.

Aparejo de taladrar portátil W-K-M con la torre plegadiza levantada.

W-K-M Company, Inc.

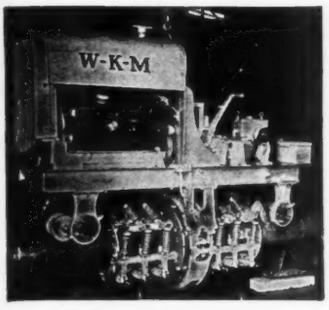
OIL FIELD, PIPE-LINE & INDUSTRIAL EQUIPMENT

HOUSTON, Texas, U. S. A.

Export Office: 74 Trinity Place, New York

Cable Address: "WILKOMAC"

W-K-M



PIPE CLEANING MACHINES
(Traveling or Stationary)

Cleans both old and new lines. Travels along made-up line at variable speeds under its own power, cleaning two or more miles daily. Its double cleaning head contains hundreds of toothed cutter wheels, which produce a chipping action, removing all scale, rust, dirt, etc. A series of steel wire brushes then brush pipe to a clean, bright surface. Special scraper knives remove felt or wrapping. Readily convertible from one size to another by simple adjustments, or from traveling to stationary cleaning machine. Built in sizes to clean 2" to 24" pipe.

MACHINES A NETTOYER LES TUYAUX
(Roulants ou fixes)

Cette machine nettoie tant les conduites anciennes que les neuves. Se déplace sur ligne improvisée à des vitesses variables sans force motrice extérieure, nettoyant deux milles de tuyaux ou plus par jour. Sa tête nettoyeuse double est pourvue de centaines de roues fraiseuses dentées, qui produisent un effet de burinage enlevant à fond les incrustations, la rouille, la saleté, etc. Une série de brosses métalliques d'acier brosse le tuyau, lui donnant une surface propre et brillante. Des couteaux racleurs spéciaux enlèvent le feutre ou revêtement. On passe instantanément de machine à nettoyer roulante à machine fixe, ou d'un calibre à l'autre par de simples ajustements. Choix de tailles pour le nettoyage de tuyaux de 2 à 24 pouces.

MAQUINAS LIMPIADORAS DE TUBOS
(En tipos móviles y fijos)

Limpia tuberías viejas y nuevas. Se mueve por encima de la tubería, a velocidades variables, bajo su propia fuerza, limpiando dos o más millas al día. Su doble sabeza limpiadora contiene centenares de ruedas, que producen una acción cortante, que quita toda las costra, moho, tierra, etc. Una serie de cepillos de alambre limpia luego la superficie dejándola brillante. El forro de fieltro y otras envolturas se quitan con cuchillas raspadoras especiales. Se gradúa de un tamaño a otro, mediante sencillos ajustes, y se convierte de máquina móvil a máquina fija con igual facilidad. En tamaños para limpiar tuberías de 2" a 24".

ROTARY SLIPS
Type 35—Friction Slips

Latest advancement in rotary slips. Thoroughly field tested on the longest pipe strings. Allows more gripping area, greater holding capacity, and softer action. Takes hold or releases instantly, and will not slip, cut or bottleneck pipe. Extreme light weight permits ease of handling. Highly flexible. Should wear occur on segments, they're readily replaced on derrick floor, or resharpened at nominal cost. Long life assured by highest quality, one-piece, drop-forged and heat-treated segments.

FOURREAUX ROTATIFS
Type 35—
Fourreaux à frottement

Le dernier mot en fourreaux rotatifs. Eprouvé à fond au chantier sur les plus longs faisceaux de tuyaux. Il offre une plus grande surface de prise, un plus grand pouvoir de serrage et une action plus douce. Saisit ou relâche instantanément, et n'est pas susceptible de lâcher, couper ou coincer le tuyau saisi. Une très grande légèreté en permet un maniement facile. Maximum de souplesse. Si les segments viennent à s'user, on en fait instantanément le remplacement sur le plancher de la chèvre, ou encore on peut les réaffûter à peu de frais. Une longue vie utile leur est assurée par l'emploi de segments de la plus haute qualité, d'une seule pièce, estampés et traités thermiquement.

SUJETADORES ROTATIVOS
Tipo 35—Sujetadores de fricción

El más reciente refinamiento en sujetadores rotativos. De utilidad demostrada en servicios prácticos extraordinarios. Ofrece mayor superficie de agarro, mayor capacidad de sujeción y acción más suave. Agarra o suelta instantáneamente, y no se resbala ni atasca en el tubo. Su peso extremadamente liviano facilita su manejo. Muy flexible. Cuando ocurre desgaste en los segmentos, estos pueden fácilmente renovarse en el piso del armazón de taladrar o afilarse de nuevo a poco costo. Su prolongada duración está asegurada por los segmentos enterizos de acero forjado a martinete y tratado térmicamente.

TUBING SLIPS

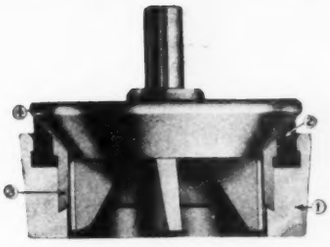
Built to fit 1¼" to 4" tubing, in regular type (for medium depths) and deepwell type for handling long strings. Grips instantly and releases freely. One man handles it. 4- and 6-segment construction, forged steel throughout. Eliminates one elevator and one pair of tongs. Reduces tubing pulling time 25%, with proportionate oil savings.

FOURREAUX DE TUBAGE

Ce fourreau est prévu pour s'adapter au tubage de 1¼ de pouce à 4 pouces, de type régulier (pour les profondeurs moyennes) et de type pour puits profonds pour le maniement des longs faisceaux. Saisit instantanément et relâche de même. Un homme suffit à la manoeuvre. Type à 4 et 6 segments, tout en acier forgé. Permet de supprimer un élévateur et une paire de tenailles. Abrège de 25% la durée de l'opération d'extraction du tubage, d'où des économies de pétrole en rapport.

SUJETADORES DE TUBERIA

Construídos para ajustar en tubos de 1¼" a 4", en tipo regular (para profundidades medianas) y en tipo de pozo profundo, para tubería larga. Agarra instantáneamente y suelta con facilidad. Un solo hombre lo maneja. Construcción de 4 y 6 segmentos de acero forjado. Elimina un elevador y un par de tenazas. Reduce el tiempo de salida de tubería en 25%, con proporcional economía en aceite.



TWIN-SEAT VALVE

The TWIN-SEAT Valve, so named because of its combination rubber and steel seats, doubles the life of slush pump mud ends. Bronze body (1) of valve fits into pump deck and stays there, saving approximately 28% in replacements. All wear is thrown on easily replaced rubber (2) and steel (3) insert seats, and this wear is minimized because valve (4) cannot seat in exactly the same place twice due to force of fluid on valve guides changing position of travel of valve. Two positive, leak-proof seats are provided, first seal being on rubber insert, which absorbs shock and compresses until valve is fully seated and cushioned on both rubber and steel. This feature prevents pounding. Fully descriptive literature upon request.

SOUPAPE A SIEGES JUMELÉS

La soupape à SIEGES JUMELÉS est ainsi dénommée à cause de ses sièges combinaison acier et caoutchouc, et son emploi double la vie utile des extrémités à boues de pompe à sédiments. Le corps de bronze (1) de la soupape s'adapte à la plateforme de pompe et y reste, économisant environ 28% en remplacements. Toute l'usure est reportée sur le caoutchouc facilement remplaçable (2) et les sièges rapportés (3) en acier, et cette usure se trouve réduite au minimum par suite du fait que la soupape (4) ne peut pas porter deux fois de suite exactement au même endroit sur son siège, car la pression du liquide sur les guides de soupape change la position de course de la soupape. Deux sièges positifs, antifuites, sont prévus, le premier joint étant sur caoutchouc rapporté, ce qui absorbe les chocs et exerce une compression jusqu'à ce que la soupape repose complètement sur son siège, sur caoutchouc et acier. Ce dispositif élimine le cognement. Documentation complète sur demande.

VALVULA TWIN-SEAT

La válvula TWIN-SEAT, llamada así por su combinación de asientos de caucho y de acero, aumenta al doble la duración de los extremos de la bomba de barro. El cuerpo de bronce (1) de la válvula ajusta en la cubierta de la bomba y queda aquí ahorrando como 28% en repuestos. Todo el desgaste lo reciben el asiento de caucho (2) de fácil renovación y el asiento insertado de acero (3). Este desgaste es reducido a causa de que la válvula (4) no puede sentarse dos veces en el mismo punto, debido a la presión del líquido contra las guías de la válvula, la cual cambia la posición del movimiento de la válvula. Hay dos asientos a prueba de escape. El primero está representado por una inserción de caucho, que absorbe los choques y se comprime hasta que la válvula queda completamente sentada y bien dispuesta en los asientos de caucho y de acero. Este rasgo evita el golpeteo. Información detallada a socilitud.

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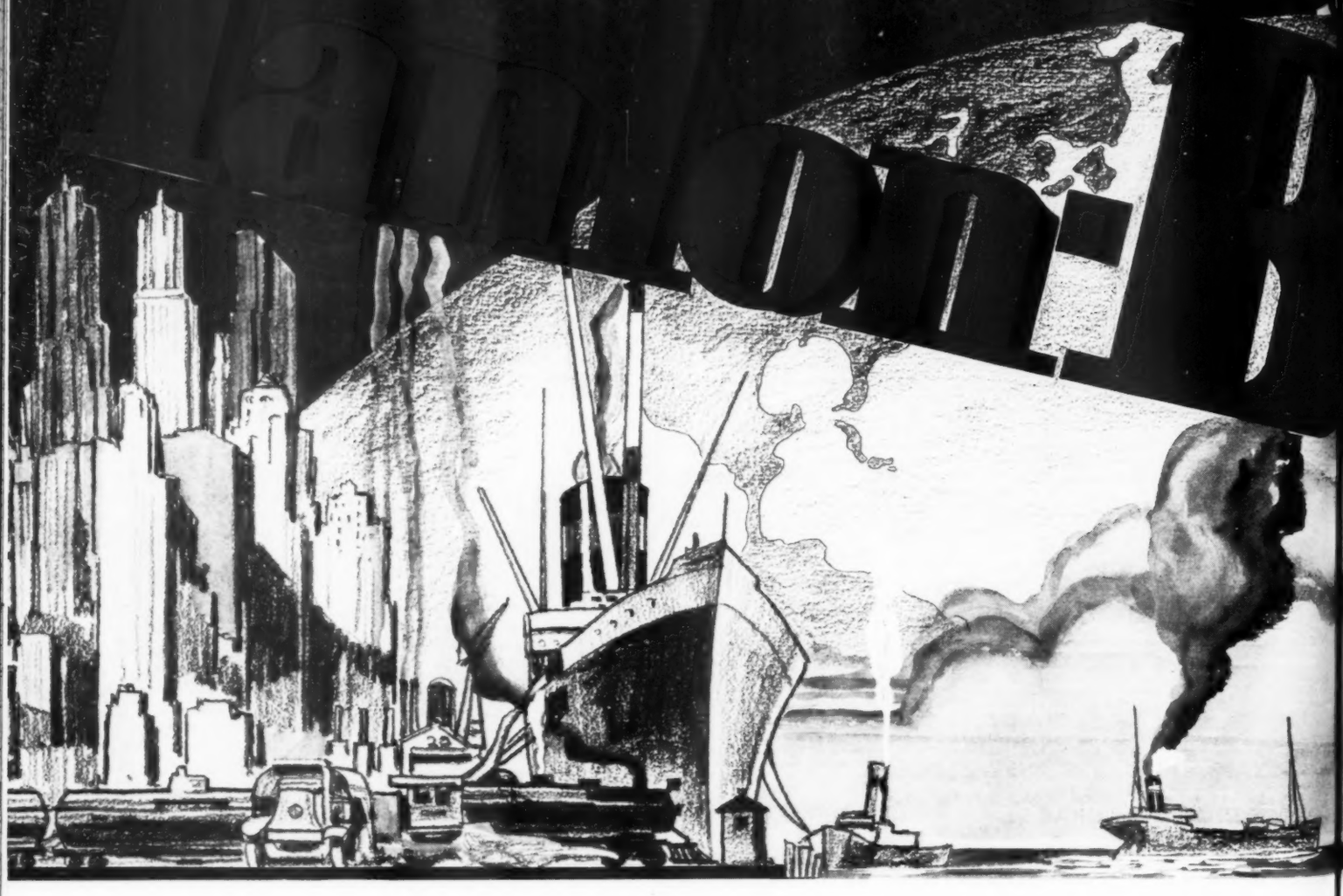

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Plus d'un quart de siècle d'expérience dans la production et la distribution de l'essence naturelle, pour le dosage avec tous genres d'huiles brutes et de raffinerie, est à votre disposition pour vous aider à résoudre vos problemes relatifs aux caractéristiques de vos carburants à moteur.

Nous avons à nos points terminus de Goodhope, La., et de Houston ou Corpus Christi, Texas, des cargaisons complètes, des cargaisons partielles ou des lots de wagon-citerne, offrant un vaste choix d'indices de volatilité et de coefficients d'octane supérieur, tout prêts a être livrés. Si vous avez des problémes de dosage à résoudre, discutez la question "essence naturelle" avec Hanlon-Buchanan, Inc.

A CENTURY
OF GASOLINE INDUSTRY

GASOLINE · MANUFACTURER

Unretouched photo of typical Lufkin installation

Photo non retouchée d'une installation Lufkin typique.

Fotografía sin rectocar de una instalación típica "Lufkin."

LUFKIN—Pioneers in Geared Units

The first Lufkin geared unit for oil field pumping was installed in a Texas oil field in 1924. This was the first reduction gear unit to ever successfully operate in deep production. Since that time Lufkin Units have been installed in every major field of the world and today are considered standard equipment by more than three hundred major operators in domestic and foreign fields. So completely has the LUFKIN GEARED UNITS revolutionized the method of pumping oil wells, that it is now conceded by engineers high in the oil industry, that geared units are the modern accepted medium by which power is transferred from the prime mover to the polish rod.

Lufkin gear units are principally of the Herringbone type, but are also furnished in worm gear type and are manufactured in sizes to suit any field condition from shallow production to the world's deepest wells. Central geared pumping powers are available from 50 to 150 horsepowers.

Auxiliary equipment such as beams, posts, pitmans and all types of surface equipment are also manufactured in the most improved types.

EXPORT SERVICE

All equipment for export are carefully crated in steel-bound and bolted crates conforming to custom regulations of countries to which shipped. Export offices are maintained in New York at 149 Broadway.

LUFKIN—Pionniers en groupes à engrenages

Le premier groupe Lufkin à engrenages pour pompage pétrolier a été installé dans un champ de pétrole du Texas en 1924. Ce groupe a été le premier groupe à engrenages démultiplicateurs qui ait fonctionné avec succés en production de puits profonds. Depuis lors, les groupes Lufkin ont été installés dans tous les champs pétroliers importants et sont considérés à l'heure actuelle comme matériel standard par plus de trois cents exploitants d'élite dans les champs de pétrole nationaux et étrangers. Les GROUPES A ENGRENAGES LUFKIN ont révolutionné à tel point le mode de pompage des puits de pétrole que les ingénieurs pétroliers leur accordent la première place dans la branche et que les groupes à engrenages sont maintenant le mécanisme moderne approuvé au moyen duquel l'énergie est transmise du groupe-moteur à la tige dite polisseuse.

Les groupes à engrenages Lufkin sont surtout du type à chevrons, mais sont aussi offerts du type à engrenages à vis sans fin; en outre, ils sont offerts en tailles convenant à toutes les conditions possibles d'exploitation depuis les puits peu profonds jusqu'aux puits de la plus grande profondeur au monde. Il est offert des groupes-force centraux de pompage à démultiplication, allant de 50 à 150 CV.

L'équipement auxiliaire, comme les poutrelles, les montants, les pitmans et tout genre d'équipement de surface, est aussi fabriqué en types des plus perfectionnés.

SERVICE D'EXPORTATION

Tout matériel destiné à l'exportation est logé avec soin dans des caisses à clairevoie cerclées d'acier et boulonnées en conformité avec les exigences douanières des pays destinataires. Les bureaux d'exportation sont à New York, 149 Broadway.

LUFKIN—Los primeros en grupos de engranajes

El primer grupo de engranajes Lufkin, para bombaje de petróleo, fué instalado en un campo petrolífero de Texas en 1924. Este grupo fué el primer mecanismo o equipo de engranajes desmultiplicadores en funcionar con éxito en la extracción de petróleo de pozos profundos. Desde entonces, los equipos Lufkin se han instalado en casi todos los campos petrolíferos más importantes y se consideran actualmente como la norma de la industria por más de trescientas importantes empresas petroleras nacionales y extranjeras. Los GRUPOS DE ENGRANAJES LUFKIN han revolucionado el método de bombaje de los pozos de petróleo hasta el punto de que los ingenieros del ramo les acuerdan el primer lugar en su campo, reconociendo que son los mecanismos modernos y eficaces para la transmisión de la energía del motor al sistema de aspiración.

Los equipos de engranajes desmultiplicadores o de reducción Lufkin son principalmente del tipo de espina de pez, pero se ofrecen también en tipo de tornillo sin fin. Por otra parte, se ofrecen también en tamaños convenientes a todas las condiciones posibles de explotación, para pozos de baja profundidad, lo mismo que para los pozos más profundos del mundo. Ofrecemos grupos motores centrales de bombaje con capacidades de 50 a 150 c. de f.

El equipo auxiliar, como balancines, montantes, bielas de conexión y otros accesorios de instalación exterior, se ofrece también en modelos o tipos notablemente perfeccionados.

SERVICIO DE EXPORTACION

Todo material destinado a la exportación se empaca con sumo cuidado en huacales bien sujetos por precintas de acero y pernos, en conformidad con las exigencias aduaneras de los países de destino. El departamento de exportación está en 149 Broadway, Nueva York, N. Y., E. U. A.

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OTHER OFFICES IN PRINCIPAL OIL FIELDS.

(Continued from Page 177)

at a favorable position without drilling through great thicknesses of material difficult to penetrate, or to bottom the hole up, dip where a better well can be completed. Another use for deflected drilling is placing holes started at some distance from wells out of control in juxtaposition with the bottom of the wild well. Many wells have been brought under control by this method and pumping into the formation mud or a fluid mixture to seal the pores of the producing formation in the vicinity of the bottom of the offending well. This is the reverse of the pressure control system which is planned to keep mud fluids from entering the pores and closing them and indicates modern rotary processes are variable to suit widely differing conditions.

Another recent improvement in rotary well control has been development of a mixture of sugar cane fibre and cement or mud to seal off permeable formations. Loss of drilling fluid in rotary holes has caused considerable trouble and expense and to regain circulation many different substances have been dumped into the hole to fill the cavity and permit the mud to build up a sustaining wall. This miscellaneous method has been both costly and uncertain, but with the newer process of using a specially prepared fibre in varying lengths to suit different conditions and mixing it with cement or mud fluid permeable formations can be quickly sealed and lost circulation restored.

HOT MUD

In the Rodessa, Louisiana, field difficulty with hot mud was experienced in drilling earlier wells. Near the surface the temperature in the hole is about 104° F. and gradually increases to about 152° F. at 5,000 feet where the first stringers of anhydrite are encountered. In this zone the temperature increases very quickly to around 160° F. and in the next 1,000 feet where the hole passes through massive anhydrite and nearly 500 feet of gas and oil-producing formations the temperature

Electrically-powered artificial lift

increases to about 180° F. In many instances the temperature at 6,000 feet below the surface is recorded as 190° F. or more, and mud returns from this lower portion of the hole register as high as 192° F. temperature.

To remove some of the heat from this mud many devices have been used. The surface is largely sand and does not lend itself to large mud pits or mud ditches. At some drilling sites contractors have sprayed the return mud fluid through holes drilled in sections of 4- and 6-inch pipe and in this manner aerated and cooled the mud. The mud can then be handled in relatively small pits.

Other operators have installed flumes and settling boxes with mud screens at the discharge end of the return pipe from the well so all cuttings are removed from the mud soon after they are deliv-

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On a été amené à appliquer cette méthode afin de pouvoir exploiter les formations supérieures inaccessibles et qu'on considérait définitivement perdues. Dans les formations calcaires, on peut raviver la production en faisant l'application d'acide chlorhydrique pour ouvrir les pores, et on a aussi fait l'essai de ce qu'on a appelé des "solvants à boues" dans les formations sableuses obstruées par de l'ancienne boue d'exploitation au rotatif. Un procédé consiste à imprégner la boue de pierre à chaux qu'on peut ensuite récupérer par l'acide chlorhydrique. Sans doute, il y a certains inconvénients à ajouter une matière inerte comme la chaux à des boues de forage, mais ces inconvénients n'annulent pas les multiples avantages qu'on s'assure par l'emploi de boues imprégnées de chaux.

Un autre progrès à signaler est celui accompli dans le contrôle de la direction des puits, tant pour la verticalité que l'azimuth. Dans certains cas, il est nécessaire de pratiquer un puits qui s'écarte de la verticale parfaite et cela afin de parvenir à une formation productrice sous un angle favorable évitant de forer à travers des couches épaisses de structure difficile à pénétrer, ou de buter le puits avec inclinaison vers le haut où un meilleur puits peut être pratiqué. Une autre application du forage dévié consiste à placer des trous commencés à quelque distance de puits hors de contrôle en juxtaposition par rapport au fond du puits dont on n'est plus maitre. On s'est de nouveau rendu maître d'un grand nombre de puits grâce à cette méthode, ainsi qu'en introduisant dans la formation par pompage de la boue ou un mélange liquide destiné à obturer les pores de la formation productrice dans le voisinage du fond du puits récalcitrant. C'est là le contraire du système de contrôle des pressions, qui a pour objet d'empêcher les liquides boueux de pénétrer les pores et de les boucher, ce qui met en évidence le fait que les procédés de forage rotatif modernes varient afin de s'adapter aux conditions extrêmement variables d'exploitation.

Parmi les autres perfectionnements récents, réalisés dans le contrôle des puits rotatifs, il vaut encore la peine de citer la mise au point d'un méleange de fibre de canne à sucre et de ciment ou de boue pour obturer les formations perméables. Les pertes de liquide de forage dans les trous rotatifs ont causé bien des ennuis et entraînés bien des frais, et afin de rétablir la circulation, on a jeté dans le trou de forage des substances très diverses afin de combler la cavité et permettre à la boue de former un mur de soutien. Cette méthode disparate s'est montrée à la fois coûteuse et incertaine dans ses résultats, mais avec le tout dernier procédé consistant à employer une fibre spécialement préparée en longueurs variables selon les conditions en présence, puis à mélanger cette fibre avec du ciment ou un liquide boueux, on est à même d'obturer promptement les formations perméables et ainsi de rétablir la circulation temporairement interrompue.

BOUES CHAUDES

Dans le champ pétrolifère de Rodessa, Louisiane, on s'est heurté lors du forage des premiers puits à des difficultés dues aux boues chaudes. Près de la surface, la température dans le trou de forage est environ de 104° F. et augmente graduellement jusqu'à environ 152° F. à une profondeur de 5000 pieds, où l'on rencontre les premières couches d'anhydrite. Dans cette zone, la température augmente très rapidement pour bientôt atteindre 160° F., et avec les 1000 pieds suivants, où le puits traverse de l'anhydrite massif et des formations productrices de pétrole et de gaz représentant près de 500 pieds, la température augmente d'environ 180° F. Dans de nombreux cas, la température enregistrée à la profondeur de 6.000 pieds en-dessous

(Continué sur Page 192)

(Continué de Página 177)

La perforación con presión controlada se está utilizando en muchos campos para combatir la tendencia del barro espeso a tapar las arenas superiores productivas, que pueden tratarse más tarde. Este requisito ha nacido del hecho de que al tratarse de explotar las formaciones superiores pasadas, se han hallado completamente tapadas. En formaciones de piedra caliza, la producción puede recuperarse aplicando ácido hidroclórico, para abrir los poros, y se han ensayado ciertos "disolventes de barro" en formaciones de arena tapadas por el barro apretado dejado por la ratativa. Un método es impregnar el barro con piedra caliza, la cual puede quitarse con ácido hidroclórico. Hay ciertas desventajas en añadir un material inerte, como la piedra caliza, al barro de perforación, pero ellas no nulifican del todo muchos de los beneficios que se ganan mediante el empleo de barro con impregnación de piedra caliza.

Otro progreso se presenta en el gobierno de la dirección del agujero, tanto en sentido vertical como en el de azimut. A veces es conveniente desviar un agujero de su exacto curso vertical, para llegar a una formación productiva, en una posición favorable, sin necesidad de perforar a través de grandes espesores de material de difícil penetración. La perforación desviada se aprovecha también para colocar los agujeros empezados a ciertas distancia de pozos sin control, en contigüidad al fondo del pozo activo. Muchos pozos se han regulado de esta manera y con la ayuda de inyección por bomba de barro de formación o de una mezcla líquida, para tapar los poros de la formación productiva en la vecindad del fondo del pozo sin control. Esto es todo lo contrario del sistema de presión controlada, el cual se aplica para impedir que los líquidos de barro entren en los poros, cerrándolos o tapándolos, e indica que los modernos procedimientos rotatorios son variables, a fin de adaptarse a condiciones muy diferentes.

Otro reciente progreso en la perforación rotatoria de pozos es el desarrollo de una mezcla de fibra de caña de azúcar y cemento o barro, para tapar formaciones permeables. La pérdida de líquido de perforación, ha causado mucha molestia y gasto, y para restablecer la circulación, se han vaciado en el agujero muchas substancias diferentes, para llenar la cavidad y permitir que el barro construya una pared soportante. Este método disceláneo ha sido costoso e inseguro, pero, con el nuevo procedimiento de usar una fibra especialmente preparada, de varias longitudes, para responder a diferentes condiciones, y de mezclar esta fibra con cemento o líquido de barro, se ha logrado tapar rápidamente un gran número de formaciones permeables y restablecer la circulación perdida.

BARRO CALIENTE

En el campo petrolífero de Rodessa, Louisiana, el barro caliente presentó dificultades en la perforación de los primeros pozos. Cerca de la superficie, la temperatura del pozo es cerca de 104° F. y aumenta gradualmente a cerca de 152° F. a 5.000 pies, donde se recogieron las primeras muestras de anhidrita. En esta zona la temperatura aumenta rápidamente a cerca de 160° F., y en los siguientes 1.000 pies, donde la perforación pasa por anhidrita maciza y por cerca de 500 pies de formaciones productivas de gas y petróleo, la temperatura aumenta casi a 180° F. En muchos casos, la temperarura a 6.000 pies desde la superficie, llega a 190° F. o más y el barro levantado de esta profundidad extrema llega a acusar hasta 192° F.

Para quitar parte del calor de este barro se han empleado varios aparatos. La superficie es principalmente arenosa y no se presta a grandes hoyos o zanjas de barro. En algunos puntos de

(Continué en Página 192)

AQUAGEL AQUAGEL AQUAGEL

AQUAGEL is a trouble-proof drilling clay containing a high concentration of gel-forming colloids which are responsible for most of the desirable qualities in a drilling mud. When added in small percentages to a mud, it helps to build a thin, impermeable filter cake on the walls of the hole, lessens the amount of water penetrating the formation and reduces the danger of caving. It prevents settling of solids and lubricates all moving parts. One hundred forty to 180 barrels of excellent mud can be prepared from each ton of AQUAGEL, making a great saving in initial cost of the mud.

AQUAGEL is used daily in practically all oil fields of the world to perform the following functions: prevent caving and loss of circulation; prevent settling of mud solids and cuttings in the hole; prevent a thick filter cake on the walls of the hole; reduce abrasion; seal-off fissures and caves; maintain high circulation rate with moderate pump pressures; seal-off minor flows of gas and water; insure landing of long strings of casing without sticking; increase speed of drilling, etc. Furnished in special packages for export shipment.

AQUAGEL est une argile de forage sans défaillance qui contient une forte proportion de colloïdes à formation de gélatine; ce sont ces colloïdes qui donnent à une boue de forage la plupart de ses qualités désirables. Quand on en ajoute de petits pourcentages à une boue, elle favorise la formation d'un gateau-filtre mince et imperméable sur les parois du trou de forage, diminue la quantité d'eau qui pénètre dans la formation et réduit le danger d'éboulement. Il empêche le dépôt de matières solides et graisse toutes les pièces mobiles. Avec une tonne d'AQUAGEL, on peut préparer de 140 à 180 barils d'excellente boue, ce qui assure une grande économie dans le coût initial de la boue.

AQUAGEL s'emploie jour après jour dans pour ainsi dire tous les champs de pétrole du monde, où il remplit les fonctions suivantes: il prévient les éboulements et les pertes de circulation; il prévient le dépôt de particules solides et rognures de boue dans le puits; il empêche la formation d'un gateau-filtre épais sur les parois du puits; il réduit l'abrasion; il bouche les fissures et crevasses; il maintient une vitesse élevée de circulation avec des pressions modérées de pompe; il obture les écoulements secondaires de gaz et d'eau; il permet la descente de longs faisceaux de revêtement sans risque de coin-cement; il augmente la vitesse de forage, etc. Fourni en paquets spéciaux à l'exportation.

AQUAGEL es una arcilla de perforación segura, que contiene una gran proporción de coloides formativos de gelatina, que son los elementos que da al barro de perforación la mayor parte de sus buenas propiedades. Cuando es agregada en pequeños porcentajes al barro, favorece la formación de una delgada capa filtrante e impermeable sobre la pared del hoyo de perforación, limita la cantidad de agua que penetra en la formación y reduce el peligro de hundimiento. Evita la acumulación de materias sólidas y lubrica todas las piezas de movimiento. Con una tonelada de AQUAGEL se puede preparar de 140 a 180 barriles de excelente barro, lo que asegura una gran economía en el costo inicial del barro.

AQUAGEL se emplea casi a diario en todos los campos petrolíferos del mundo, donde responde a las exigencias siguientes: evita los hundimientos y la pérdida de circulación: evita la acumulación de partículas sólidas y desperdicios de barro en el pozo, impide la formación de una espesa capa filtrante sobre la pared del pozo; reduce el desgaste; cierra las trizaduras y cavidades; mantiene una velocidad elevada de circulación con presiones moderadas de bomba; cierra los flujos secundarios de gas y de agua; permite la descensión de largas hileras de revestimiento, sin peligro de trabazón; aumenta la velocidad de la perforación, etc. Se suministra en paquetes especiales para la exportación.

STABILITE STABILITE STABILITE

STABILITE is unexcelled for reducing the viscosities of thick drilling muds and at the same time enhancing their wall-building properties, and for freeing gas. It quickly releases gas from gas-cut muds and maintains a workable viscosity in highly weighted muds. STABILITE presents no hazards in mixing or handling and assures lower mud treating costs. Sold in 50-gallon drums or in powdered form in 10-pound cans. One hundred pounds of powder is equivalent to a 50-gallon drum of liquid STABILITE.

STABILITE est sans égal pour réduire les viscosités des boues de forage épaisses, tout en améliorant leurs propriétés de formation de parois, et se distingue aussi pour libérer les gaz. Il libère promptement le gaz des boues chargées de gaz, et maintient une viscosité convenable dans les boues très chargées. STABILITE ne présente aucun risque dans le mélange ou la manutention, et assure un bas prix de revient du traitement des boues. Il est vendu dans des tambours de 50 gallons, ou sous forme de poudre dans des boites de 10 livres. Cent livres de poudre correspondent à un tambour de 50 gallons de STABILITE liquide.

El STABILITE no tiene rival para reducir las viscosidades de los barros de perforación espesos, mejorando sus propiedades de formación de pared. Por otra parte, propende también a la salida del gas. Libra de su gas a los barros cargados de gas y mantiene una viscosidad conveniente en los barros muy cargados. El STABILITE no presenta ningún riesgo en la mezcla o en el manejo, y asegura un gasto más bajo en el tratamiento del barro. Se vende en tambores de 50 galones, o en la forma de polvo, en cajas de 10 libras. Cien libras de polvo equivalen a un tambor de 50 galones de STABILITE líquido.

BAROID PRODUCTS

BAROID: Extra-Heavy Colloidal Drilling Mud.
AQUAGEL: Trouble-Proof Colloidal Drilling Mud.
STABILITE: An Improved Chemical Mud Thinner.
BAROCO: An Economical, Salt Water-Resisting Drilling Clay.
FIBROTEX: For Preventing Or Regaining Lost Circulation In Drilling Wells.

PRODUITS BAROID

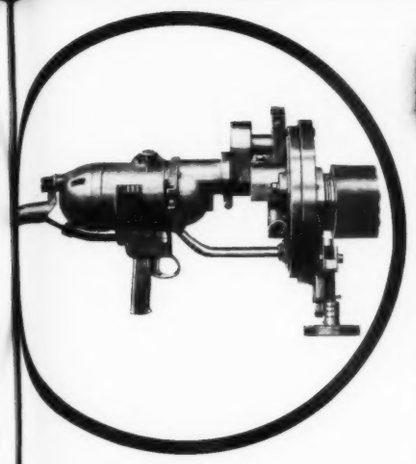
BAROID: Boue de forage colloïdale, extra-lourde.
AQUAGEL: Boue de forage colloïdale, sans défaillance.
STABILITE: Un diluant de boues chimique, amélioré.
BAROCO: Une argile de forage économique, résistant à l'eau salée.
FIBROTEX: Servant à prévenir ou récupérer les pertes de circulation dans les puits de forage.

PRODUCTOS BAROID

BAROID: Barro coloidal, bien espeso, para perforación.
AQUAGEL: Barro coloidal para perforación, de acción sin falla.
STABILITE: Un disolvente químico para el barro, notablemente mejorado.
BAROCO: Una arcilla económica de perforación, resistente al agua salada.
FIBROTEXT: Para evitar o recuperar las pérdidas de circulación en los pozos de perforación.

NATIONAL PIGMENTS & CHEMICAL DIVISION
NATIONAL LEAD COMPANY

BAROID
SALES OFFICES
LOS ANGELES
TULSA
HOUSTON

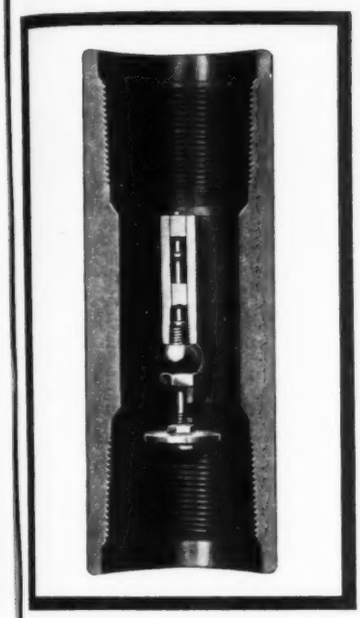


OOL JOINT REFACING — SAVES MONEY AND DOUBLES THEIR LIFE

Why take chances with loose tool joints when they can be quickly refaced in the yard or in the field. The Portable Tool Joint Refacer offered by Johnston assures tight joints that shoulder properly. It also saves costly handling and hauling since the work can be done at the rig.

Pourquoi courir des risques avec des joints d'outils desserrés, alors qu'il est possible de les rectifier rapidement au chantier ou sur le champ même. La rectifieuse portative de joints d'outils offerte par Johnston assure des joints serrés qui viennent s'épauler correctement. Elle épargne aussi la manutention et le transport coûteux, puisque le travail peut être fait sur place.

¿ Para qué correr riesgos con juntas de herramientas sueltas, cuando ahora es posible retificarlas rápidamente en el pozo o el mismo campo? La rectificadora portátil de juntas de herramientas ofrecida por la Johnston asegura juntas o uniones bien cerradas, que coinciden perfectamente. Esta rectificadora ahorra también el subido gasto de manejo y transporte, a causa de que permite hacer el trabajo en el mismo punto en que se origina.

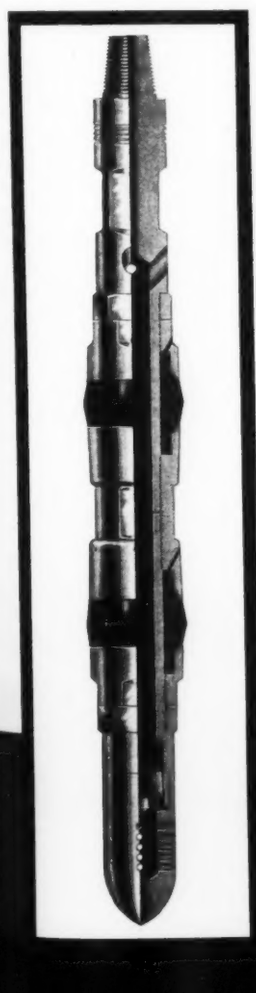


RYAN FLOW VALVES . . . . . .

A kick-off valve, and flow valve automatic in its operation and complete in a single unit. We offer a modern method of producing oil (not to be confused with old gas lift methods) that meets the requirements of the most economical operation. A tested and proven means of producing oil. Our engineers will gladly assist in solving your producing problems.

Une soupape de reprise et soupape d'écoulement automatique dans son fonctionnement et au complet en un seul groupe. Nous offrons une méthode moderne de production du pétrole (à ne pas confondre avec les méthodes anciennes d'élévation des gaz), qui repond aux exigences d'une exploitation ultra-économique. C'est un moyen éprouvé, qui a fait ses preuves en pratique, pour la production pétrolière. Nos ingénieurs sont à votre entière disposition pour vous aider à résoudre vos problèmes de production.

Una válvula de represa y una válvula de flujo de funcionamiento automático, en completa combinación en un solo grupo. Ofrecemos un método moderno de producción de petróleo (que no debe confundirse con los antiguos métodos de elevación de gas) que responde a las exigencias de una explotación muy económica. Es un medio comprobado, que ha demostrado su valor en la práctica, para la producción petrolífera. Nuestros ingeniero están a su completa disposición para ayudarle a resolver sus problemas de producción.



YLER SWAB . . . . . .

Largest possible by-pass area permits free falling. Minimum of friction going into the hole. Freely pulls an efficient load each run. Rubbers automatically expand by hydraulic action. Simplicity of design insures proper rubber adjustment, compensating for wear. Reversible rubbers give longer life. Ease of part replacement means lower upkeep. Reversible valve permits down swabbing. Rubbers of different hardness and elasticity supplied to fit different well conditions.

La plus grande zone possible de dérivation permet la chute libre. Minimum de frottement à l'entrée dans le trou. Extrait librement à chaque parcours une charge efficace. Des blocs en caoutchouc se dilatent par action hydraulique. La simplicité mécanique assure l'ajustage convenable des blocs-caoutchouc, compensant pour l'usure. Des blocs-caoutchouc réversible assurent une durée plus longue. La facilité de remplacement des pièces assure de moindres frais d'entretien. Une soupape réversible permet l'écouvillonnage en descendant. Blocs-caoutchouc de dureté et élasticité variables fournies pour s'adapter aux diverses conditions des puits.

La zona de derivación más grande posible permite la caida libre.

JOHNSTON OIL TOOLS

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OIL TOOLS, INC.

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Los Angeles, Calif.
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Bakersfield 2794, Ventura 5621

Tampico Warehouse

Senor E. O. Chapa, Union Sales Representative in Mexico

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WIRE LINES BUILT FOR

UNION Wire Lines stand out as distinctive, in the Oil Industry, because they are manufactured in the Mid-Continent, world's greatest oil area, by oil men. The Oil Industry needed extra-hardy, extra-reliable wire lines. UNION engineers studied oil field conditions and produced the needed lines.

ROTARY DRILLING LINES are right lay in 6x19 Flexible Seale (Fig. 1), 6x19 Warrington (Fig. 2), and in some special constructions. UNION has standardized on 6x19 Flexible Seale with either Hemp or Independent Wire Rope Center (in 1⅛" diameter and larger). Sizes run from ¾" diameter up. Materials are usually Plow Steel or Improved Plow.

CABLE TOOL DRILLING LINES. The line in most general use is 6x19 Warrington (Fig. 2). In the Mid-Continent and Gulf Coast and in foreign fields, these lines are ordered right lay. In the Eastern, Mountain and California fields they are usually left lay. In the Eastern fields 6x7, left lay, (Fig. 6) is also used. Materials are usually Cast Steel or Mild Plow.

TUBING AND SUCKER-ROD LINES. The line in general use is 6x31 left lay, Hemp Center, (Fig. 3), ½" to ⅞" diameter. 6x19 Warrington (Fig. 2), 6x19 Filler Wire (Fig. 4), and 18x7 Non-Rotating (Fig. 5), are sometimes used. Tubing Lines are usually one size larger than Sucker-Rod Lines. Materials are Cast Steel, Plow or Improved Plow.

SAND LINES are 6x7 right lay (Fig. 6). Sizes ¼" to ¾". Materials Cast Steel or Mild Plow.

CASING LINES. Standard for cable tool is 6x19 Warrington right lay (Fig. 2), in Cast Steel, Mild Plow, Plow or Improved Plow. Sometimes Rotary and Cable Tool drilling lines are used as Casing Lines.

CLEANING-OUT LINES are usually one size smaller than drilling lines specified for the location.

SWABBING LINES are also of similar lay and construction to drilling lines.

PUMPING LINES are usually 6x7 left lay.

REFINING. Cracking Lines are one of the 6x19 types, right lay, with all-steel wire rope center.

UNION publishes a valuable 232-page Wire Rope Handbook, pocket-size. A copy will be gladly sent you.

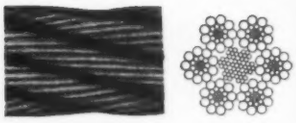

Fig. 1—6x19 Flexible Seale, with I. W. R. C.

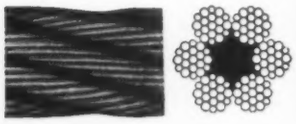

Fig. 2—6x19 Warrington Hemp Center

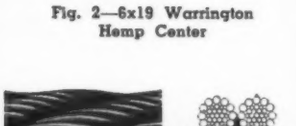

Fig. 3—6x31, Hemp Center

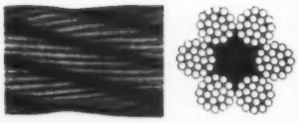

Fig. 4—6x19 Filler Wire Hemp Center

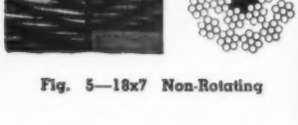

Fig. 5—18x7 Non-Rotating

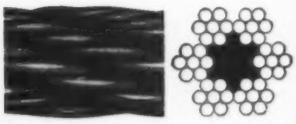

Fig. 6—6x7, Hemp Center

Стальные проволочные канаты, изготовленные для обслуживания нефтяной индустрии.

Стальные проволочные канаты UNION выделяются в нефтяной индустрии по своему качеству, так как они изготовляются в Средних Штатах, являющихся самой большой продуктивной зоной в мире, под руководством персонала, знающего нефтяное дело. Нефтяная индустрия требует экстра-прочные и экстра-надежные стальные канаты. Инженеры фирмы UNION изучили условия работ на нефтяных промыслах и создали стальные канаты требуемого качества. Стальные канаты UNION завоевали себе широкую и все время растущую репутацию на местных и заграничных промыслах.

СТАЛЬНОЙ КАНАТ ДЛЯ ВРАЩАТЕЛЬНОГО БУРЕНИЯ имеет правый завиток и состоит из 6-ти гибких секций по 19 проволок в каждой (фиг. 1), или 6 x 19 секций типа Warrington (фиг. 2), либо в некоторых случаях имеет специальную конструкцию. Стандартным канатом UNION является канат из 6 x 19 гибких секций (диаметром в 1⅛" и большим) с сердцевиной из пеньки или из независимого стального проволочного каната. Размер канатов начинается от ¾" в диаметре и выше. Обычным материалом служит плуговая сталь или улучшенная плуговая сталь.

СТАЛЬНЫЕ КАНАТЫ ДЛЯ КАНАТНОГО БУРЕНИЯ. Для этой цели обычно применяется канат 6 x 19 Warrington с сердцевиной из пеньки (фиг. 2). В средних штатах и у Мексиканского залива, а также на заграничных промыслах применяются канаты с правым завитком. На Восточных, Горных и Калифорнийских промыслах применяют канаты с левым завитком. Диаметры обычно варьируют от ¾" до 1". На Восточных промыслах также применяются канаты 6 x 7 (фиг. 6), имеющие левый завиток. Материалом обычно служит литая сталь или мягкая плуговая сталь.

СТАЛЬНЫЕ КАНАТЫ ДЛЯ НАСОСНЫХ ТРУБ И НАСОСНЫХ ШТАНГ. Для этой работы обычно применяют стальной канат 6 x 31 с левым завитком и сердцевиной из пеньки (фиг. 3), диаметром от ½" до ⅞", или 6 x 19 Warrington (фиг. 2), либо канат типа Filler 6 x 19 (фиг. 4), а иногда, также 18 x 7 нескручивающегося типа (фиг. 5). Стальные канаты для насосных труб обычно на один номер толще, чем канаты для насосных штанг. Материалом служит литая сталь, плуговая сталь или улучшенная плуговая сталь.

СТАЛЬНЫЕ КАНАТЫ ДЛЯ ЧИСТИЛЬНЫХ БАРАБАНОВ. Для этой работы применяются канаты 6 x 7 с правым завитком (фиг. 6) диаметром от ¼" до ¾". Материалом служит литая сталь или мягкая плуговая сталь.

СТАЛЬНЫЕ ТАЛЕВЫЕ КАНАТЫ. Стандартным стальным канатом для канатного бурения служит канат 6 x 19 Warrington из литой стали с правым завитком (фиг. 2). Эти канаты могут быть заказаны из мягкой плуговой стали, плуговой стали или улучшенной плуговой стали. Иногда стальные канаты для вращательного и для канатного бурения применяются как талевые канаты.

СТАЛЬНЫЕ КАНАТЫ ДЛЯ ЧИСТКИ. Эти канаты обычно одним номером меньше, чем бурильные канаты, употребляемые в той-же скважине.

СТАЛЬНЫЕ КАНАТЫ ДЛЯ СВАБИРОВАНИЯ. Эти канаты также имеют меньше завитков и более слабую конструкцию, чем бурильные канаты.

СТАЛЬНЫЕ КАНАТЫ ДЛЯ ОТКАЧКИ ОБЫЧНО ПРИМЕНЯЮТСЯ 6 x 7 с левым завитком.

СТАЛЬНЫЕ КАНАТЫ ДЛЯ НЕФТЕПЕРЕГОННЫХ ЗАВОДОВ. На крэкинг установках применяют стальные канаты одного и того-же размера 6 x 19 с правым завитком и с сердцевиной из стального каната. Длина этих канатов варьирует, но они обычно снабжены коушами, расплющенными по обоим концам каната.

Фирма UNION издает ценный карманный справочник по стальным проволочным канатам в 232 страницы. Мы с удовольствием вышлем Вам экземпляр этого справочника.

JARECKI MFG. CO.

Distributors: Mid-Continent, New Mexico and Eastern Oil Fields

Warehouse: Monahans, Texas

UNION WIRE ROPE

Executive and Sales Offices: 601 Beacon Life Bldg., Tulsa, Oklahoma

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UNION WIRE LINES

The "ULTIMATE LOW COST WIRE ROPE"

Plant of the Union Wire Rope Corporation, Kansas City, Missouri, U.S.A.

OIL INDUSTRY SERVICE

Cables Metálicos Para La Industria Petrolera

Los cables metálicos UNION WIRE LINES son los más sobresalientes en la industria del petróleo porque se fabrican al centro del continente, la región más productiva de petróleo del mundo, por una compañia especialista en el ramo. La industria petrolera necesitaba cables metálicos de extraordinaria firmeza, resistencia y duración. Los ingenieros de la UNION estudiaron las condiciones del campo petrolifero y construyeron los cables que se necesitaban. Los cables metálicos UNION WIRE LINES están gozando de creciente popularidad en los campos petroliferos nacionales y del extranjero.

CABLES PARA PERFORACIÓN ROTATORIA se ofrecen con trama a la derecha en tipos flexibles de 6 x 19 Seale (Fig. 1) y 6 x 19 Warrington (Fig. 2) y en otras construcciones especiales. La UNION se ha especializado en el flexible Seale de 6 x 19 con centro de cáñamo o independiente de cuerda de alambre (en diámetros de 1¼" y mayores). Los tamaños son de ¾" y más. Los materiales son ordinariamente acero de arado o acero especial de arado.

CABLES PARA HERRAMIENTA PERFORADORA. El cable de mayor uso es el tipo Warrington de 6 x 19 con centro de cáñamo (Fig. 2). En la región central y en la costa del golfo del país, lo mismo que en muchos campos petroliferos del extranjero, estos cables se piden con trama a la derecha. En las regiones del este, sierras y campos de California, se piden con trama a la izquierda. Los diámetros se comprenden generalmente entre ¾" x 1". En los campos del éste se emplea también el de construcción de 6 x 7 (Fig. 6) con trama a la izquierda. Los materiales son ordinariamente acero fundido o acero regular de arado.

CABLES PARA TUBERIA Y VASTAGO DE ASPIRADOR. El cable de mayor uso es el de 6 x 31 de trama a la izquierda. con centro de cáñamo, (Fig. 3) en diámetro de ½" a 7/8". El de 6 x 19 Warrington (Fig. 2), el 6 x 19 de tipo llenador (Fig. 4) y el 18 x 7 de tipo no giratorio (Fig. 5) se emplean también a veces. Los cables para tuberia son generalmente un tamaño más grande que los cables para vástagos de aspiración. Los materiales son acero fundido, acero de arado o acero especial de arado.

CABLES PARA ARENA. Son de 6 x 7 de trama a la derecha (Fig. 6). Tamaños de ¼" a ¾". Materiales: acero fundido o acero regular de arado.

CABLES PARA REVESTIMIENTOS. El normal para herramienta de cable es el de 6 x 19 Warrington de acero fundido con trama a la derecha (Fig. 2). Estos cables se hacen de acero regular de arado, acero de arado o acero especial de arado. A veces se emplean los cables de perforación rotatoria o los de herramienta perforadora, como cables para revestimientos.

CABLES DE EXTRACCIÓN. Generalmente son un tamaño menor que el cable de perforación empleado en la explotación.

CABLES DE LIMPIEZA O FROTACIÓN. Son también similares en trama y construcción a los cables de perforación.

CABLES PARA BOMBA. Son generalmente de 6 x 7 con trama a la izquierda.

REFINERÍA. Los cables para servicios en plantas de destilación completa por el procedimiento "cracking" son invariablemente los de tipo 6 x 19 con trama a la derecha, con centro de alambres de acero. Estos cables varian en longitud, pero generalmente tienen en cada extremo un firme dado ranurado para la conexión segura.

La UNION publica un valioso Manual de Cables Metálicos de 232 páginas, formato de tolsillo, que será enviado gustosamente a quien lo pida.

Câbles Métalliques Construits Pour L'Industrie Du Pétrole

Les câbles métalliques UNION se distinguent partout dans l'industrie du pétrole parce qu'ils sont fabriqués dans la région centrale américaine, parmi les plus productrices de pétrole du monde, et cela par des experts du pétrole. L'industrie du pétrole avait besoin de câbles métalliques extra-solides, sans la moindre défaillance en service. Les ingénieurs UNION ont étudié les conditions des champs pétrolifères et ont créé les câbles y répondant. Les câbles UNION font l'objet d'une demande vaste, sans cesse croissante dans les chantiers étrangers qu'aux Etats-Unis.

CABLES DE FORAGE ROTATIF. Ils sont à commettage à droite en Seale souple de 6x19 (Fig. 1), Warrington 6x19 (Fig. 2), et en quelques structures spéciales. UNION a standardisé sur Seale souple de 6x19 avec soit centre en chanvre, soit centre indépendent en câble de fil métallique (en diamètre de 1⅞ pouce et au-dessus). Grandeurs à partir de ¾ de pouce de diamètre. Il est généralement employé de l'acier de charrue ou de l'acier super de charrue.

CABLES DE FORAGE D'OUTILS A CABLE. Le câble le plus généralement employé est le Warrington de 6x19 avec noyau de chanvre (Fig. 2). Au centre des Etats-Unis et sur le Golfe du Mexique, ainsi que sur des champs étrangers, ces câbles sont commandés avec commettage à droite. Sur les chantiers de l'Est, de la section montagneuse, et de Californie, on les demande avec commettage à gauche. Les diamètres vont habituellement de ¾ à 1 pouce. Sur les champs de l'Est, la structure 6x7 (Fig. 6) s'emploit aussi et est commandée avec commettage à gauche. Ils sont a'ordinaire en acier coulé ou acier coulé ou acer doux de charrue.

CABLES DE TUBAGE ET DE TIGE D'ASPIRATEUR. Le câble le plus couramment employé est celui de 6x31 avec commettage à gauche, noyau de chanvre, (Fig. 3), en diamètre allant de ½ à 7/8 de pouce. On emploie quelquefois aussi le Warrington de 6x19 (Fig. 2), le type à noyau de fil de 6x19 (Fig. 4), et le type non rotatif de 18x7 (Fig. 5). Les câbles de tubage sont généralement une taille plus grande que les câbles de tige d'aspi ateur. Ils sont fabriqués en acier coulé, en acier de charrue ou en acier super de charrue.

CABLES DE SABLE. Ils sont prévus de 6x7 avec commettage à droite (Fig. 6). Tailles de ¼ à ¾ pouces. Faits en acier coulé ou en acier doux de charrue.

CABLES DE REVÊTEMENTS. Standard pour outil de câble est le Warrington de 6x19 en acier coulé avec commettage a droite (Fig. 2). Ces câbles peuvent se commander en acier de charrue, acier doux de charrue, ou acier super de charrue. Quelquefois les câbles de forage rotatif et d'outils à câble sont employés comme câbles de revêtements.

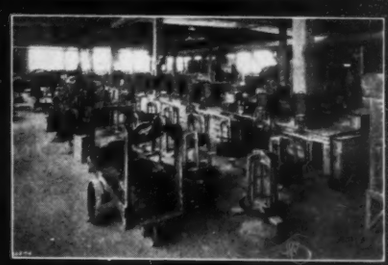
CABLES DE NETTOYAGE. Ils sont généralement d'une taille en-dessous des câbles de forage spécifiés pour l'endroit.

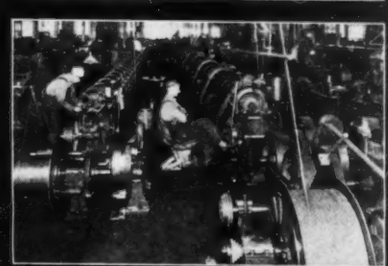
CABLES DE TORCHONNAGE. Ils sont de commetage et structure analogues à ceux des Câbles de forage.

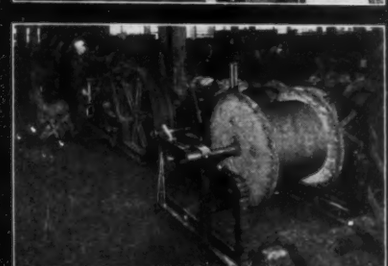
CABLES DE POMPAGE. Ils sont habituellement de 6x7 avec commettage à gauche.

RAFFINEMENT. Les câbles employés au cracking sont invariablement un des types 6x19, avec commettage à droite, avec centre en câble de fil tout-acier. Ces câbles ont une résistance variable, mais ils sont habituellement munis d'une forte cosse à épissure à chaque extrémité.

UNION publie une brochure très documentée de 232 pages sur les câbles métalliques. Un exemplaire vous en sera envoyé avec plaisir.







Views in Plant of Union Wire Rope Corporation

CORPORATION

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Exclusive Export Agents:

LUCEY EXPORT CORP., Woolworth Bldg., New York; Broad St. House, London **Branch: Portland, Oregon**

MARION MACHINE FOUNDRY & SUPPLY CO.

Rocky Mountain Fields, except New Mexico

UNION WIRE LINES

The "ULTIMATE LOW COST WIRE ROPE"

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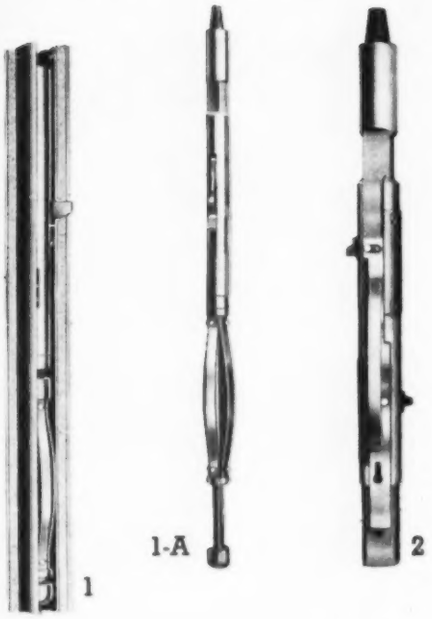
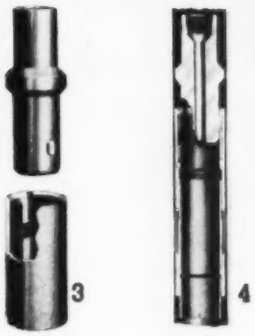
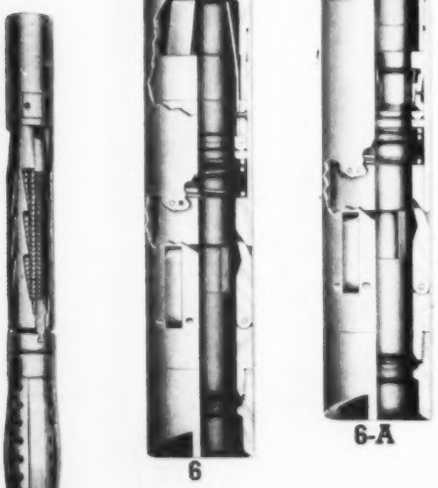
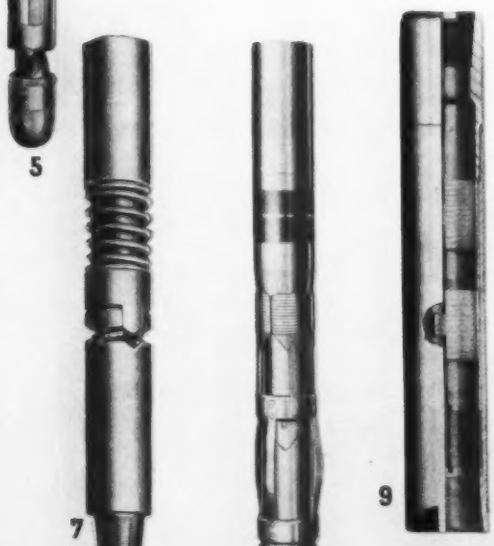




SAFE-MODERN ECONOMICAL

Practical oil men, working with engineers skilled in oil field practice, designed and perfected these Baash-Ross oil tools. Years of safe, successful operation in oil fields throughout the world have proved them to be correct in principle, easy to use and economical. Complete operating instructions accompany every shipment to insure the operator of satisfactory results. For a more complete description of these and other Baash-Ross oil tools refer to our section in your new 1937 Composite Catalog, or write for illustrated literature.





1—1A. The Long Knife Perforator is positive in action and penetrates two strings of casing with cement between them. Punches any desired number of holes. Made for Rotary and Cable Tools.

2. The Star-Wheel Perforator punches evenly spaced holes through one string of casing. Made for both rotary and cable tools. Unsurpassed for fast operation.

3. The Baash-Ross Liner Setter and Adapter insure safety in running and removing liners of any length. (See Numbers 4 and 8 also.)

4. Packing type Adapter is attached to the top of the liner and permanently seals between the liner and casing. Easy to set and release.

5. The extra long, flat-backed slips of the Rotary Releasing Spear are solidly backed up by the three-step surface of the body. Slips are uniformly set and positively released by rotation of the fishing string. Withstands long, continuous jarring without damage.

6—6A. The External Drill Pipe Cutter is run on washover pipe. The cut is quickly made by rotating the fishing string, and the cut-off pipe is retained in the washover pipe by the overshot springs while being withdrawn from the hole. Interchangeable slip assembly (shown in 6-A) adapt this cutter for cutting external flush joint drill pipe.

7. The Autolock Safety Joint permits all rotation in either direction required for the operation of fishing tools. Safely releases if tools become stuck in the hole.

8. This packing-type Liner Hanger effects a permanent seal between the casing and the liner and supports the longest liner with safety. Releases easily when liner is to be pulled; can be used over and over again.

9. The Packing Casing Bowl effects a permanent connection between new casing and the casing remaining in the well after a defective section has been removed.

10. Open End Tubing Spider is installed without disconnecting flow lines. Slips are attached to self-locking tong and operated as a unit.

11. This Baash-Ross Blowout Preventer is the only positive means of preventing blowouts and should be on every drilling well. Always in working condition.

12. This non-sparking oil saver closes the well and allows all of the fluid to be expelled through the flow lines while the well is being swabbed or bailed. Automatically opens, closes and seals.

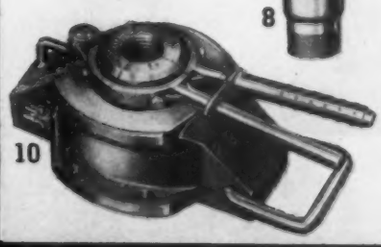
13. The full length rollers of the Roller Kelly Bushing insure even, controlled feed of kelly through rotary without binding when coring, drilling and fishing. Maximum driving surface with minimum friction.

14. This Internal Casing Cutter is the most popular of all inside cutting tools. Made in all sizes to cut casing, tubing or internal flush joint drill pipe.

15. The force of the blow delivered by this Improved Kammerdiner Rotary Jar is governed by the torque created in the fishing string. Automatically tripped by a straight pull; automatically re-set by lowering the drill pipe.

16. Trubore Forged Upset Kellys are forged to true size from alloy steel, and scientifically heat treated to produce the best physical properties. Made in all standard and special lengths, sizes and circulation hole diameters.

17. The circulation hole through Baash-Ross Trubore Drill Collars, drilled on highly specialized machines, is centered accurately for its entire length, and is without offsets to cause turbulence and sand cutting. Scientifically heat treated to produce the best physical properties. Trubore Drill Collars are stocked in standard sizes; any special design made to your specifications.

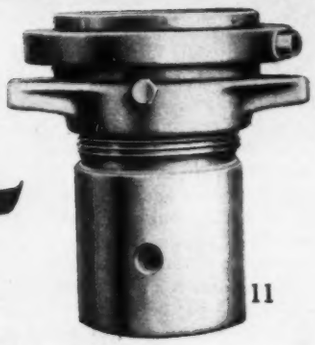


BAASH-ROSS TOOL COMPANY

Free Information

Write today for illustrated literature giving descriptions and operating details of the Baash-Ross Tools shown on these pages, or refer to our section in the new 1937 Composite Catalog.

-Ross TOOLS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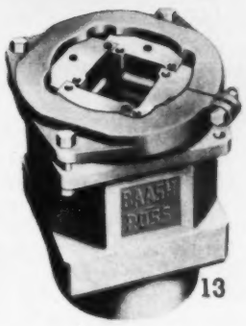

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SURS—MODERNES —ECONOMIQUES

Les foreurs pétroliers, de concert avec des ingénieurs entraînés dans la pratique des champs de pétrole, ont conçu et perfectionné ces outils pétroliers Baash-Ross. Des années de succès et un record de sécurité en service dans les champs de pétrole du monde entier en ont prouvé le principe correct, la facilité d'emploi et l'économie à l'usage. Un mode d'emploi détaillé accompagne chaque fourniture afin que l'exploitant en tire un maximum de résultats. Pour avoir une description plus détaillée de ces outils et d'autres outils pétroliers de Baash-Ross, consulter notre section dans votre nouveau catalogue combinaison de 1937, ou nous demander notre documentation illustrée.

1. Le perforateur à long couteau est d'action positif et pénètre deux faisceaux de revêtement avec du ciment entre eux. Il perfore tout nombre de trous désiré. Prévu pour outils rotatifs ou sur câble.

2. Le perforateur à roue étoilée perce des trous également espacés dans un faisceau de revêtement. Prévu pour outils rotatifs ou sur câble. Sans pareil pour la rapidité de fonctionnement.

3. Le pose-fourreaux Baash-Ross avec adapteur assure la pose et l'extraction sûre des fourreaux de tout longueur. (Voir aussi Numéros 4 et 8.)

4. L'adapteur du type à garniture se fixe au haut du fourreau et crée une étanchéité permanente entre le fourreau et le revêtement. Facile à poser et à dégager.

5. Les coulisses à dos plat extra-longues de l'harpon rotatif de dégagement viennent s'appuyer solidement sur la surface à trois gradins du corps. Les coulisses se posent également et se dégagent positivement par rotation de la ligne de repêchage. Résistent longtemps aux chocs répétés sans aucune avarie.

6. La fraise externe de tuyau de forage est employée sur tuyau dit de lavage. L'entaille est faite rapidement par rotation de la ligne de repêchage, et le tuyau entaillé est retenu dans le tuyau de lavage par les ressorts du grappin pendant son extraction du trou. Un fourreau interchangeable (rèprésenté en 6-A) adapte cette fraise à l'entaillage du tuyau de forage externe à joint affleurant.

7. Le joint de sûreté à auto-verrouillage permet la rotation dans les deux sens demandés par l'opération des outils de repêchage. Dégagement de sûreté si les outils viennent à se coincer dans le trou.

8. Ce suspenseur de fourreaux du type à garniture établit un joint permanent entre le revêtement et le fourreau et supporte le plus long fourreau en toute sécurité. Se dégage facilement lorsqu'on a besoin d'extraire le fourreau; il peut s'employer d'une manière répétée indéfiniment.

9. Le bol de revêtement à garniture crée un raccord permanent entre le nouveau revêtement et le revêtement qui reste dans le puits après qu'on en a extrait une section défectueuse.

10. Le croisillon de tubage à extrémité ouverte s'installe sans qu'on ait besoin de débrancher les conduites d'écoulement. Les coulisses se fixent à une pince de verrouillage automatique et fonctionnent comme un groupe autonome.

11. Ce pare-éclatement Baash-Ross est le seul moyen positif en existence pour prévenir les éclatements, et tout foreur avisé devrait en avoir un sur chaque puits de forage. Il est toujours en ordre de marche.

12. Cet économiseur de pétrole, non producteur d'étincelles, obture le puits et permet à tout le fluide d'être évacué par les conduits d'écoulement pendant qu'on écouvillonne ou qu'on écoppe le puits. Il s'ouvre, se ferme et étanchéifie automatiquement.

13. Les rouleaux de toute la longueur, prévus sur le coussinet Kelly à rouleaux, assurent un débit régulier et contrôlé du kelly par le rotatif, sans risque de coincement lors du carottage, du forage ou du repêchage. Un maximum de surface de commande avec un minimum de frottement.

14. Cette fraise interne de revêtement est le plus prisé de tous les outils de fraisage intérieur. Gamme complète de tailles pour fraiser les revêtements, tubage ou tuyaux de forage interne à joint affleurant.

15. La force du choc produit par cet ébranleur rotatif perfectionné Kammerdiner est réglée par le couple qui s'établit dans le faisceau de repêchage. Déclenché automatiquement par une traction en ligne droite; reposé automatiquement en descendant le tuyau de forage.

16. Les Kellys Trubore à renflements forgés sont forgés exactement à la cote à partir d'acier spécial, et sont traités scientifiquement à la chaleur afin d'obtenir les meilleures propriétés physiques. Prévus pour toutes les longueurs, tailles et diamètres de trou de circulation, standard ou spéciaux.

17. Le trou de circulation dans les colliers de forage Trubore de Baash-Ross, foré sur des machines de haute spécialisation, est centré avec précision sur toute sa longueur, et ne présente pas de décalages de nature à occasionner la turbulence et le rayage du sable. Soumis à un traitement thermique scientifique afin de réaliser les meilleures propriétés physiques. Les colliers de forage Trubore sont stockés en tailles standard; tout type spécial peut être fabriqué sur spécifications.

RENSEIGNEMENTS GRATUITS

Demandez-nous dès aujourd'hui notre documentation illustrée qui donne des descriptions et des détails de fonctionnement sur les outils Baash-Ross présentés sur ces pages, ou consultez notre section dans le nouveau catalogue combinaison de 1937.

SEGURAS—MODERNAS —ECONOMICAS

Hombres prácticos en la explotación del petróleo, en concierto con ingenieros especialistas en las prácticas técnicas de la industria petrolera, han ideado y perfeccionado las herramientas Baash-Ross para trabajos petroleros. Muchos años de funcionamiento completamente seguro y satisfactorio, en los campos petrolíferos de todo el mundo, han demostrado su correcto principio, la facilidad de su empleo y la economía de su uso. Completas instrucciones para su manejo acompañan a cada herramienta, para que el explotador pueda sacar de ella resultados prácticos máximos. Para obtener una descripción más detallada de estas herramientas y de otros equipos petroleros de marca Baash-Ross, sírvase consultar nuestra sección en su nuevo catálogo combinado de 1937, o bien, pídanos directamente nuestro catálogo ilustrado.

1. El perforador de cuchilla larga es de acción positiva y penetra dos canalizaciones de revestimiento con cemento entre ambas. Perfora cualquier número de agujeros deseado. Adaptado a herramientas rotativas o de cable.

2. El perforador de rueda estrellada perfora agujeros equidistantes en una hilera de revestimiento. Adaptado a herramientas rotativas o de cable. No tiene rival en lo tocante a rapidez de funcionamiento.

3. El instalador de forro Baash-Ross, provisto de adaptador, asegura fácil colocación y extracción de forros de cualquiera longitud. (Véanse también los números 4 y 8.)

4. El adaptador de tipo obturador se fija arriba del forro y establece una hermeticidad permanente entre el forro y el revestimiento. Fácil de colocar y de quitar.

5. Los sujetadores de lado plano de gran longitud del arpón giratorio de disparo quedan apoyados sólidamente sobre la superficie de tres pasos del cuerpo. Los sujetadores se solocan uniformemente y se sueltan de un modo positivo por la rotación de la línea de pesca. Resisten durante mucho tiempo los choques continuos sin sufrir daño.

6. La fresa externa de tubo de perforación se emplea en el tubo de lavado. El corte se hace con rapidez, girando la línea de pescar y el tubo cortado queda retenido en el tubo de lavado por los resortes del agarrador durante su extracción del agujero. Un sujetador intercambiable (representado en 6-A) adapta esta fresa al corte de tubo de perforación con junta machihembrada exterior.

7. La junta de seguridad de cierre automático permite la rotación en los dos sentidos exigidos por la operación de las herramientas de pescar. Tiene disparo o soltura de seguridad cuando las herramientas se traban en el agujero.

8. Este suspensor de forro de tipo obturador establece un cierre permanente entre el revestimiento y el forro y soporta el forro más largo con toda seguridad. Se desprende con facilidad cuando hay necesidad de extraer el forro. Puede emplearse de una manera repetida indefinidamente.

9. El recipiente de revestimiento de empaquetadura efectúa una conexión permanente entre el revestimiento nuevo y el revestimiento que queda en el pozo después de que se la quitado una sección defectuosa.

10. La cruceta o araña de tubería, de extremo abierto, se instala sin que haya necesidad de desconectar los conductos de circulación. Los sujetadores o patines se unen a una mordaza de cierre automático y funcionan como un solo grupo.

11. El eliminador de explosión Baash-Ross es el único medio positivo en existencia para evitar las explosiones. Todo perforador previsor debería instalarlo en cada pozo de perforación. Está siempre listo para funcionar.

12. El economizador de petróleo sin chispa sirve para cerrar el pozo y permitir que todo el líquido sea evacuado por los conductos de salida mientras el pozo se está limpiando con escobillón o se le está desaguando. Se abre, se cierra y se afirma automáticamente.

13. Los rodillos de tamaño completo, del cojinete de rodillo del kelly, aseguran una alimentación de control uniforme del kelly por la rotativa, sin peligro de trabarse durante la extracción de muestras, perforación o pesca. Máxima superficie de propulsión con un mínimo de rozamiento.

14. Esta fresa interna de revestimiento es la más popular de todas las herramientas de corte interior. Se ofrese en todos los tamaños para cortar revestimiento, tubería y tubo de perforación con junta interior de tipo machihembrado ras a ras.

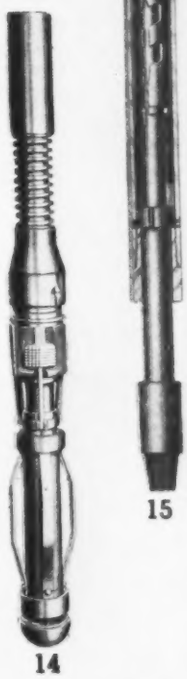
15. La fuerza del choque producida por este agitador giratorio perfeccionado de marca Kammerdiner se regula por el esfuerzo de rotación que se establece en la línea de pescar. Se desengancha o suelta automáticamente por un tiro en línea recta; se fija automáticamente bajando el tubo de perforación.

16. Las piezas kelly Trubore, de construcción científica, se forjan de especial aleación de acero y se ofrecen en tamaños uniformemente exactos. Se hacen en toda longitud, tamaño y diámetro de agujero de circulación normal o especial.

17. El agujero de circulación en los collares de perforación Trubore de Baash-Ross, perforados en máquinas muy especializadas, queda centrado perfectamente en su longitud completa y no presenta curvas que provoquen turbulencia o roce de arena. Tratamiento térmico científico, para asegurar las mejores propiedades físicass posibles. Los collares de perforación Trubore se ofrecen en tamaños corrientes. Podemos suministrarlos también en tamaños especiales, según especificaciones suministradas por los interesados.

INFORMACIÓN GRATUITA

Sírvase pedirnos ahora mismo información ilustrada, que comprende descripción detallada del funcionamiento de todas las herramientas Baash-Ross, que presentamos en estas páginas, o bien, consulte nuestra sección en el catálogo combinado de 1937.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BAASH-ROSS TOOL COMPANY

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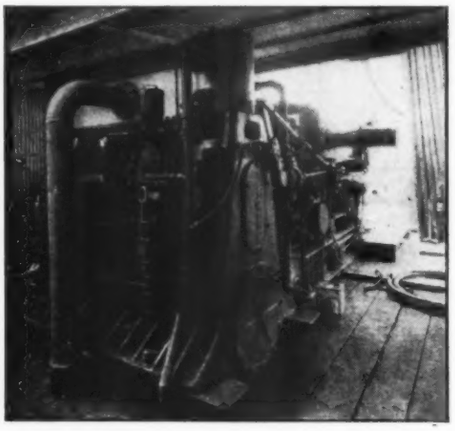
(Continued from Page 185)

ered to the surface and the screened mud pumped to an elevated mud flume, about 12 inches deep and 24 inches wide with 2-inch holes drilled at regular intervals in the bottom of the flume through which the mud escapes. The mud falls upon coarse screens placed above a lower flume which transports it to a settling box of steel near the derrick. The screen is used only to break up the stream of mud fluid and assist in aerating it. The flumes are about 100 feet long and the steel settling box about 5 feet high, 6 feet wide and 30 feet long. In this box the suction hose for the slush pump is inserted. None of the mud fluid ever flows through ditches or pits dug in the surface formation and the use of the flumes and settling boxes eliminate the cost of digging new pits, as this material is portable.

ELECTRIC CORING

This is a method of securing a continuous record of variations in resistivity of the formation to the flow of an electric current of known strength. Three nonpolarizing electrodes are suspended on a three-wire insulated cable in the hole full of mud before the casing is run. The direct current is dis-



Twin-cylinder steam engine

charged from the lowest of the electrodes and flows through the rock and is picked up by the two upper electrodes and the difference in potential between the two electrodes is measured by a potentiometer near the well mouth.

The extent to which the formations are penetrated by the current depends upon the saline content of the water in the rock pores. Formations containing oil or gas and little water display very high resistivities. Corrections must be made for variations in ground temperatures. Logs secured by this method usually show a resistivity and a porosity profile. Porosity is measured through filtration of mud fluid under hydrostatic head into the formation causing variations in the flow of the electric current.

This method of checking formations is being commonly used in rotary drilled wells.

GUN PERFORATOR

One of the newer developments generally accepted by the production division is the gun perforator. A cylindrical device fitted with several chambers filled with high explosive and steel bullets is lowered into the well inside the casing and accurately located opposite the section to be punctured. The explosive is discharged by an electric current controlled through switches on a specially designed truck near the well. These bullets pass through the casing and enter the formation back of it, making a series of holes through which oil or

(Continued on Page 197)

(Continué de Page 185)

de la surface est de 190° F. ou plus, et la boue qui remonte de cette section inférieure du registre du puits de forage, a une température atteingnant souvent 192° F.

Afin d'éliminer une partie de la chaleur de ces boues, on a eu recours à de nombreux dispositifs. La surface est en grande partie du sable et ne se prête pas à l'excavation de grandes fosses de boues ou fossés de boues. Sur certains sites de forage, les exploitants ont pulvérisé le fluide boueux de retour dans des trous forés dans des tuyaux de 4 et 6 pouces de calibre, et ont réussi de cette manière à aérer et à refroidir les boues en question. On peut alors manipuler les boues dans des fosses de dimensions relativement petites.

D'autres exploitants ont fait l'installation de rigoles et de caisses dépotoirs avec tamis à boues à l'extrémité d'évacuation du tuyau de retour du puits, de sorte que toutes les rognures sont éliminées des boues peu après qu'elles sont amenées à la surface, et la boue filtrée est pompée jusqu'à une rigole à boues surélevée, mesurant environ 12 pouces de profondeur et 24 pouces de large, avec des trous de pouces forées à intervalles réguliers dans le fond de la rigole, trous à travers lesquels la boue s'échappe. Les boues tombent sur des tamis grossiers disposés au-dessus d'une rigole inférieure qui les transportent à un dépotoir ou décanteur en acier près de la grue ou chèvre. Ce tamis ne sert qu'à briser le flot de boues liquides et à aider à les aérer. Les rigoles ont environ 100 pieds de long, et le récipient de décantation mesure environ 5 pieds de haut, 6 pieds de large et 30 pieds de long. On introduit dans ce décanteur le flexible d'aspiration pour la pompe des dépôts boueux. Par suite, aucune des boues liquides ne s'écoule par des fossés ou fosses creusés dans la formation de surface, et l'emploi des rigoles et des décanteurs élimine les frais qu'entraînerait le creusage de nouvelles fosses, puisque cette substance est transportable.

CAROTTAGE ELECTRIQUE

Il s'agit là d'une méthode qui permet d'enregistrer d'une manière continue les variations de résistivité de la formation au passage d'un courant électrique de force connue. On suspend trois électrodes nonpolarisantes à un câble isolé à 3 fils dans le trou plein de boues avant de procéder à la pose du revêtement. L'électrode la plus basse décharge du courant continu qui traverse le roc et est recueilli par les deux électrodes supérieures, et la différence de potentiel entre les deux électrodes est mesurée par un potentiomètre placé près de l'ouverture du puits.

Le degré de pénétration du courant dans les formations dépend de la teneur en sel de l'eau qui se trouve dans les pores de la roche. Les gisements qui contiennent du pétrole et du gaz, et peu d'eau, enregistrent des résistivités très élevées. Il faut faire des corrections pour tenir compte des variations de températures du sol. Les graphiques qu'on obtient par cette méthode représentent généralement un profil de résistivité et de porosité. La porosité se mesure en procédant au filtrage du liquide boueux sous une tête hydrostatique introduite dans la formation, ce qui cause des variations dans le passage du courant électrique.

Cette méthode de vérification des formations ou gisements est d'un emploi courant dans les puits forés par le procédé rotatif.

PERFORATEUR-PISTOLET

Un des tout récents perfectionnements accepté généralement par la division production est le perforateur-pistolet. Il s'agit d'un dispositif cylindrique, comportant plusieurs chambres remplies d'un fort explosif et de balles d'acier, qu'on de-

(Continué sur Page 197)

(Continué de Página 185)

perforación, los contratistas hacen que este barro de salida pase por agujeros perforados en secciones de 4 y de 6 pulgadas de tubo, y de este modo lo exponen al aire para su enfriamiento. A continuación, el barro puede manejarse en hoyos relativamente pequeños.

Otros contratistas han instalado canales y cajas de asentamiento, con rejas en el extremo de descarga del tubo de regreso del pozo, para quitar todas las cortaduras del barro, a continuación de su llegada a la superficie. El barro colado se pasa, por bomba, a una canal elevada, de como 12 pulgadas de profundidad, 24 de anchura y con agujeros de 2 pulgadas perforados a intervalos regulares en el fondo, a través de los cuales se escapa el barro. El barro cae sobre rejas o cribas grandes colocadas encima de una canal inferior, la cual sirve para transportarlo a una caja de acero de asentamiento cerca de la torre o armazón de taladrar del pozo. La reja se emplea únicamente para separar la corriente de barro líquido y ayudarla a enfriarse al aire. Las canales son casi de 100 pies de longitud y la caja de acero de asentamiento tiene como 5 pies de altura, 6 pies de anchura y 30 pies de longitud. La manguera de aspiración de la bomba de barro se inserta en esta caja. Ninguna porción del barro líquido pasa por zanjas u hoyos abiertos en la superficie de la formación y el empleo de canales y cajas de asentamiento evita el gasto de excavar hoyos o pozos nuevos, pues este maerial es portátil.

DETERMINACION ELECTRICA

Este método sirve para obtener un registro contínuo de las variaciones de resistividad o resistencia específica de la formación al paso de una corriente eléctrica de fuerza conocida. Tres electrodos impolarizables se suspenden de un cable aislado de tres alambres, metido en el agujero lleno de barro, antes de que éste reciba el revestimiento. La corriente contínua se descarga del electrodo más bajo. Esta corriente pasa por la roca y es recogida por los electrodos superiores. La diferencia en potencial entre los dos electrodos es medido por un potenciómetro, cerca de la boca del pozo.

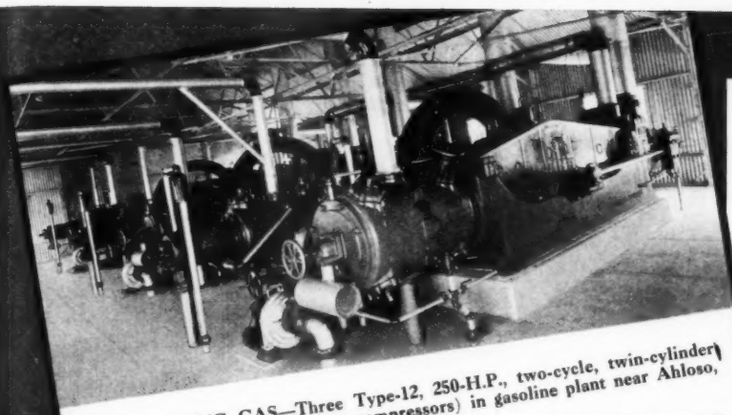
El grado de penetración eléctrica de las formaciones depende del contino salino del agua en los poros de la roca. Las formaciones que contienen petróleo o gas y muy poca agua, registran grandes resistividades. Hay que hacer correcciones, de acuerdo con las variaciones de temperaturas del terreno. Las muestras obtenidas mediante este método muestran generalmente un perfil de resistividad y de prosidad. La porosidad se mide filtrando el líquido de barro, bajo presión hidrostática, en la formación, lo que causa variaciones en el paso de la corriente eléctrica.

Este método de estudiar formaciones se sigue comunmente en conexión con pozos de perforación rotatoria.

PISTOLA PERFORADORA

Uno de los más recientes desarrollos, de aceptación general entre los productores, es la pistola perforadora. Un aparato cilíndrico, provisto de varias cámaras repletas de poderosos explosivos y balas de acero, se baja por el pozo, dentro del revestimiento, y se fija con cuidado al frente de la sección por agujerarse. La detonación del explosivo se efectúa por corriente eléctrica gobernada por interruptores colocados en un camión de tipo especial parado cerca del pozo. Las balas atraviesan el revestimiento y entran en la formación destrás del revestimiento, produciendo en ella una serie de hoyos a través de los cuales puede ex-

(Continué en Página 197)



COMPRESSING GAS—Three Type-12, 250-H.P., two-cycle, twin-cylinder *Compressor Units* (with 3-stage compressors) in gasoline plant near Ahloso, Okla., U.S.A.

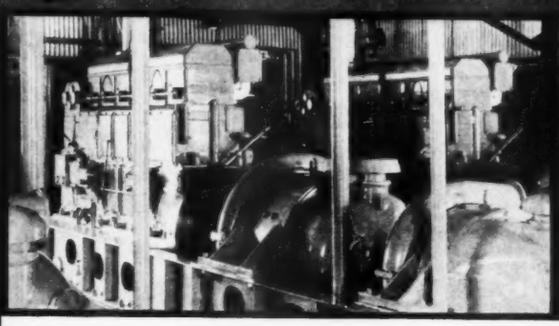
COMPRESSION DES GAZ—On voit ici trois *groupes compresseurs* (avec compresseurs à 3 phases) Type 12, de 250 CV, à deux temps et à cylindres jumelés, dans une fabrique d'essence près d'Ahloso, Okla., U.S.A.

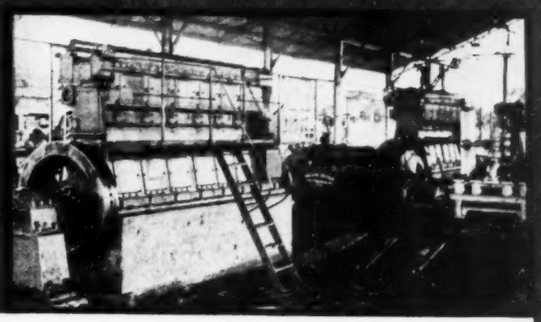
COMPRESION DE GAS—Mostramos aquí tres *grupos compresores* (con compresores de tres etapas) tipo 12, de 250 c. de f. de dos tiempos o ciclos, de cilindros gemelos, en una fábrica de gasolina cerca de Ahloso, Okla., E.U.A.

65 TYPES and SIZES of ENGINES and COMPRESSORS are built by COOPER-BESSEMER

65 Types et Tailles de Moteurs et de Compresseurs sont construits par COOPER-BESSEMER

65 Tipos y Tamanos de Motores y de Compressores se construyen por la COOPER-BESSEMER





DRILLING OIL WELLS—Three Type FP-6, 250-H.P., four-cycle *Diesel-Electric Sets* on power barge owned by Standard Oil Company of Venezuela, S.A.

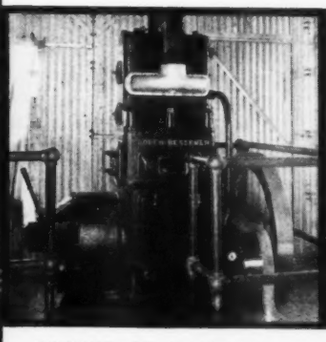
FORAGE DE PUITS DE PETROLE—Trois *groupes électriques à moteurs* Diesel 4 temps, de 250 CV, Type FP-6, sur péniche motrice appartenant à la Standard Oil Company du Vénézuéla, A.S.

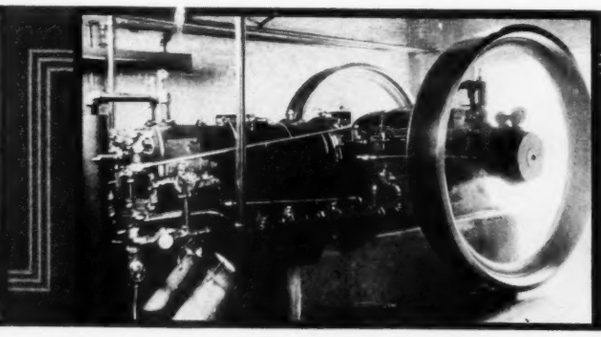
PERFORACION DE POZOS DE PETROLEO—Tres *grupos eléctricos de motores Diésel* de cuatro tiempos, de 250 c. de f., tipo FP-6, instalados en un buque de fuerza motriz perteneciente a la Standard Oil Company de Venezuela, S.A.

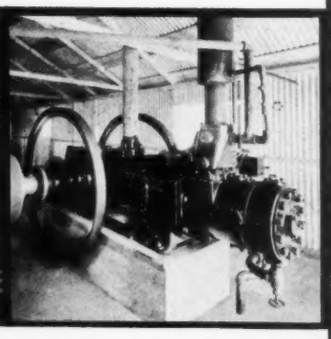
PIPE-LINE PUMPING—Six Type JT-6, 315-H.P., four-cycle *Diesel Engines* direct-driving reciprocating oil pumps for Anglo-Mexican Petroleum Corp., Mexico.

POMPAGE DE PIPE-LINE—Six *moteurs Diesel* à quatre temps, de 315 CV, Type JT-6, actionnant par commande directe les pompes alternatives à pétrole de l'Anglo-Mexican Petroleum Corp., Mexique.

BOMBAJE POR OLEODUCTOS—Seis *motores Diésel* de cuatro tiempos, de 315 c. de f. tipo JT-6, accionando directamente bombas de petróleo de la Anglo-Mexican Petroleum Corp. de México.







PUMPING OIL WELLS—Type G-SD, 40-H.P., two-cycle, twin-cylinder *Vertical Gas Engine* in Chandler field, Okla., U.S.A.

POMPAGE DES PUITS DE PETROLE—*Moteur vertical à essence*, Type G-SD, de 40 CV, à deux temps et cylindres jumelés, au champ de pétrole de Chandler, Okla., U.S.A.

BOMBAJE DE POZOS DE PETROLEO—*Motor de gas vertical*, tipo G-SD, de 40 c. de f. de dos tiempos, de cilindros gemelos, en un campo petrolífero en Chandler, Okla., E.U.A.

PUMPING HOT OIL—Type G-DT, 200-H.P., two-cycle, twin-cylinder *Horizontal Gas Engine* in refinery at Allen, Okla., U.S.A.

POMPAGE DE PETROLES CHAUDS—*Moteur horizontal à essence*, Type G-DT, de 200 CV, à deux temps et cylindres jumelés, dans une raffinerie d'Allen, Okla., U.S.A.

BOMBAJE DE PETROLEOS CALIENTES—*Motor de gas horizontal*, tipo G-DT, de 200 c. de f. de dos tiempos, de cilindros gemelos, en una refinería en Allen, Okla., E.U.A.

PUMPING OIL WELLS—Type G-AO, 40-H.P. two-cycle, single-cylinder *Horizontal Gas Engine* at Ada, Okla., U.S.A.

POMPAGE DE PUITS DE PETROLE—*Moteur horizontal à essence*, Type G-AO, de 40 CV, à deux temps et cylindre unique, à Ada, Okla., U.S.A.

BOMBAJE DE POZOS DE PETROLEO—*Motor de gas horizontal*, tipo G-AO, de 40 c. de f., de dos tiempos monocilíndrico, en Adam, Okla., E.U.A.

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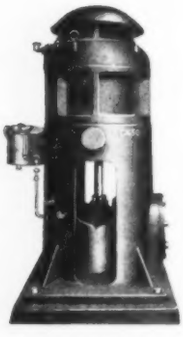
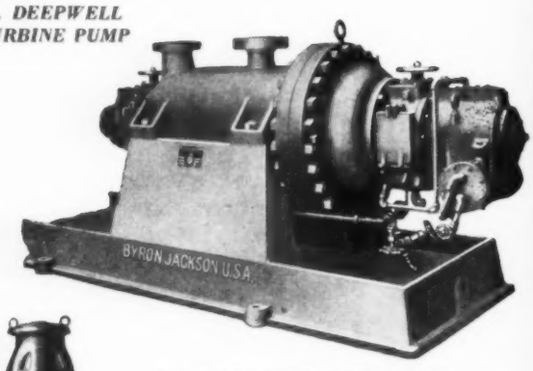
PUMPS

USED AROUND THE WORLD

for EFFICIENCY, SAFETY AND ECONOMY



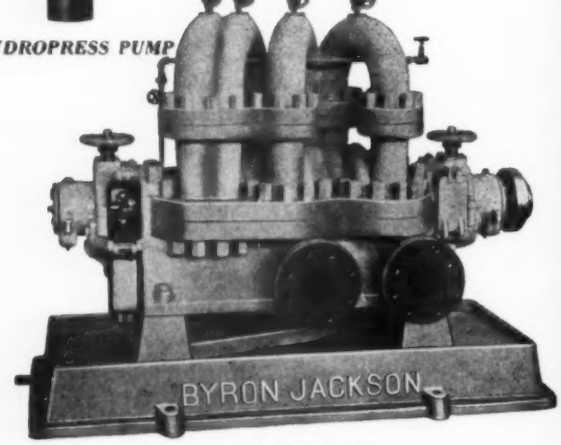
1. DEEPWELL TURBINE PUMP



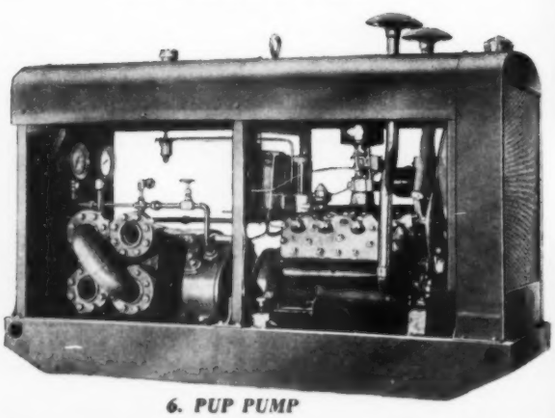
3. HOT OIL CHARGING PUMP

2. BILTON PUMP

4. HYDROPRESS PUMP



5. O. L. MULTIPLEX PUMP



6. PUP PUMP

BYRON JACKSON PUMPS

The pumps illustrated and described on this page are selected from the complete line of Byron Jackson Centrifugal Pumps that cover every requirement of the Petroleum Industry.

We invite correspondence in your own language giving us details of your operations and requirements. Our experience dating from 1872 will then enable us to make definite suggestions and recommendations to improve efficiency—to reduce your pumping costs—and to secure maximum safety in all hazardous installations.

1. Byron Jackson Deepwell Turbine Pumps for tube wells, insure a dependable, low-cost supply of water. They are made in a wide range of sizes to furnish from 50 to 10,000 gallons per minute, against heads up to 850 feet; built for direct connection to motors or steam turbines, and gear or belt drive for engines.
2. Byron Jackson Bilton Pumps combine a pump and motor in a single inexpensive, commercial unit to meet the demand for a low-priced, side-suction pump of small capacity. The unit structure eliminates misalignment; motors are splash proof; no bed plate is required.
3. Byron Jackson Hot Oil Charging Pumps use a Patented Double Case method of construction, a design with a simple cylindrical outer case having one circular joint and a longitudinally split inner case, providing accessibility for repairs without disturbing pipe connections or driver.

   The space between the inner and outer case is filled with oil at full discharge pressure, so that the forged steel outer case alone is subjected to tension stresses, while the inner case is under compression stresses only.
4. The Hydropress is a pump with a steel outer case and a longitudinally split inner volute, to give relatively low capacities at medium and high pressures, with the advantage of a smooth, non-pulsating flow. This design is rapidly replacing plunger pumps on capacities of 500 to 5000 barrels per day and pressures of 200 to 1500 pounds. The Hydropress is the only efficient, inexpensive, low capacity, high pressure centrifugal pump available for this class of work.
5. Oil Line Multiplex Pumps are furnished in two, four, or six-stage types for handling 10,000 to 45,000 barrels per day at pressures up to 1000 pounds per square inch. No balancing device is required; the horizontal split case permits removal of the rotating element without disturbing pipe connections or prime mover.
6. The Pick Up Pumping Unit - the PUP - is a portable unit combining flexibility, sturdiness, low initial and operating costs, light weight and high efficiency. Its primary application is for pipe line service but it is ideal also for water supply, fire protection or any other service which can be performed by a gasoline engine driven pump, with a wide range of pressures and capacities.

Many other exclusive Byron Jackson features are described in Pump Bulletins which should be in your files.

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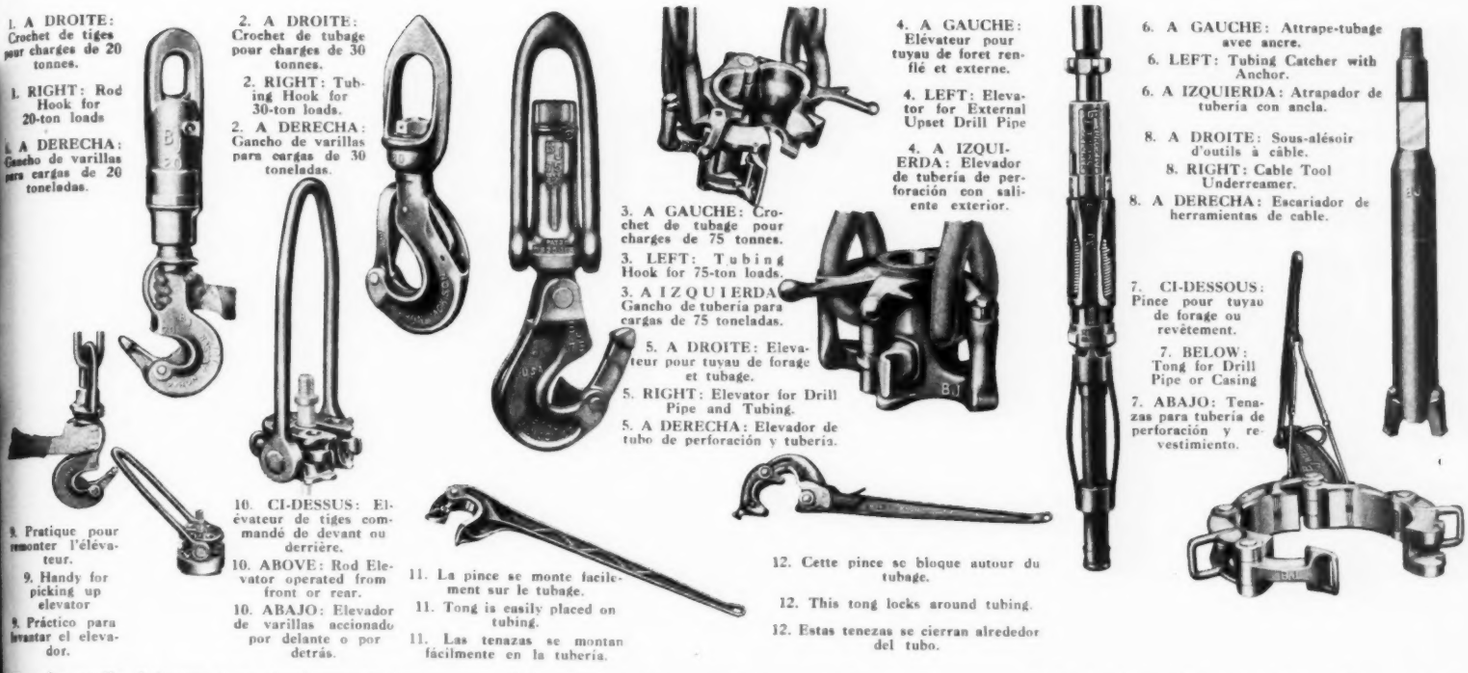

1. A DROITE: Crochet de tiges pour charges de 20 tonnes.
1. RIGHT: Rod Hook for 20-ton loads
1. A DERECHA: Gancho de varillas para cargas de 20 toneladas.

2. A DROITE: Crochet de tubage pour charges de 30 tonnes.
2. RIGHT: Tubing Hook for 30-ton loads.
2. A DERECHA: Gancho de varillas para cargas de 30 toneladas.

3. A GAUCHE: Crochet de tubage pour charges de 75 tonnes.
3. LEFT: Tubing Hook for 75-ton loads.
3. A IZQUIERDA: Gancho de tubería para cargas de 75 toneladas.

4. A GAUCHE: Elévateur pour tuyau de foret renflé et externe.
4. LEFT: Elevator for External Upset Drill Pipe
4. A IZQUIERDA: Elevador de tubería de perforación con saliente exterior.

5. A DROITE: Elevateur pour tuyau de forage et tubage.
5. RIGHT: Elevator for Drill Pipe and Tubing.
5. A DERECHA: Elevador de tubo de perforación y tubería.

6. A GAUCHE: Attrape-tubage avec ancre.
6. LEFT: Tubing Catcher with Anchor.
6. A IZQUIERDA: Atrapador de tubería con ancla.

7. CI-DESSOUS: Pince pour tuyau de forage ou revêtement.
7. BELOW: Tong for Drill Pipe or Casing
7. ABAJO: Tenazas para tubería de perforación y revestimiento.

8. A DROITE: Sous-alésoir d'outils à câble.
8. RIGHT: Cable Tool Underreamer.
8. A DERECHA: Escariador de herramientas de cable.

9. Pratique pour remonter l'élévateur.
9. Handy for picking up elevator
9. Práctico para levantar el elevador.

10. CI-DESSUS: Elévateur de tiges commandé de devant ou derrière.
10. ABOVE: Rod Elevator operated from front or rear.
10. ABAJO: Elevador de varillas accionado por delante o por detrás.

11. La pince se monte facilement sur le tubage.
11. Tong is easily placed on tubing.
11. Las tenazas se montan fácilmente en la tubería.

12. Cette pince se bloque autour du tubage.
12. This tong locks around tubing.
12. Estas tenezas se cierran alrededor del tubo.

Tous les outils ci-dessus et un grand nombre d'autres outils pétroliers BJ de grande efficacité sont décrits, illustrés et cotés dans le catalogue BJ, fourni sur demande, ainsi que dans le catalogue combiné de 1937.

1. Le crochet de tiges BJ "20" a un ressort enfermé qui soulève un support de tiges ou biellettes et prévient les avaries aux filets.
2. Le crochet de tubage BJ "30" a un "bras de verrouillage" sûr et convient aux petites grues.
3. Crochet de tubage BJ "75" avec ressort enfermé. Prévu aussi pour charges de 50 tonnes.
4. L'élévateur à loquet central BJ (Type G) est alésé pour s'adapter au tuyau de forage renflé externe; nul besoin de tampons de soulèvement.
5. L'élévateur BJ (Type A) est prévu pour service dur et fortes charges. Un maximum de sécurité et de facilité dans la manoeuvre.
6. L'attrape-tubage "Surestop" BJ prévient la chute de tubage dans le puits. Une fois ancré, il enraye l'usure des raccords et intensifie la production.
7. La pince BJ pour revêtements et rotatifs extra-lourds est robuste, sûre et commode pour la manutention des tuyaux de revêtement ou de forage.
8. Le sous-alésoir Perfection BJ est réputé depuis des années comme le plus efficace dans l'application aux outils à câble.
9. Les crochets de tiges et élévateurs de tiges BJ font une combinaison supérieure. Plus de danger, et, pourtant, une manutention plus rapide.
10. Les élévateurs de tiges BJ ont un corps d'une seule pièce et sont traités à la chaleur. Commodes à ouvrir ou fermer de devant ou de derrière.
11. La pince d'extrémité ouverte BJ est légère et facile à placer sur le tubage où elle reste en place.
12. La pince Snapon BJ se bloque sur le tubage. Elle est robuste et sûre dans l'emploi sur tubage de fort calibre.

All of the above and many other successful BJ Oil Tools are described, illustrated and priced in the BJ Catalog, sent upon request and in the 1937 Composite Catalog.

1. BJ "20" Rod Hook has enclosed spring which lifts one stand of rods and prevents damage to threads.
2. BJ "30" Tubing Hook has safe "locking arm" and is suitable in short derricks.
3. BJ "75" Tubing Hook with enclosed spring. Also made for 50-ton loads.
4. BJ Center Latch Elevator (Type G) is bored to fit external upset drill pipe; no lifting plugs are required.
5. BJ (Type A) Elevator is made for hard service and heavy loads. It is safest and easiest to operate.
6. BJ Surestop Tubing Catcher prevents dropping tubing in the well. When anchored it stops coupling wear and increases production.
7. BJ Extra Heavy Casing and Rotary Tong is strong, safe and convenient for handling casing or drill pipe.
8. BJ Perfection Underreamer, known for years as the most successful for use with cable tools.
9. BJ Rod Hooks and Rod Elevators make a successful combination. Danger is eliminated and faster operation is possible.
10. BJ Rod Elevators have body made in one piece and heat-treated. Convenient to open or close from front or rear.
11. BJ Open End Tong is light in weight and is easy to place on tubing where it remains in place.
12. BJ Snapon Tong locks on tubing. It is strong and safe to use with large size tubing.

Todas las herramientas anotadas arriba y muchas otras herramientas BJ para servicio petrolero, de gran utilidad, se describen, se ilustran y cotizan en el catálogo BJ, que suministramos a solicitud, lo mismo que en el catálogo combinado de 1937.

1. El gancho de vástago BJ "20" tiene un resorte encerrado que levanta un grupo de varillas y evita todo daño a sus roscas.
2. El gancho de tubería BJ "30" tiene un brazo de "cierre" seguro, muy conveniente para las grúas pequeñas.
3. El gancho de tubería BJ "75" con resorte encerrado. Se ofrece también para cargas de 50 toneladas.
4. El elevador con pestillo central BJ (tipo G) está perforado para adaptarse a tubo de perforación de saliente exterior; no hay necesidad de emplear tapones de levantamiento.
5. El elevador BJ (tipo A) se adapta especialmente al servicio pesado y grandes cargas. Ofrece seguridad máxima y gran facilidad en la maniobra.
6. El atrapador de tubería "Surestop" BJ evita la caída de la tubería en el pozo. Una vez anclado, evita el desgaste del acoplamiento y aumenta la producción.
7. Las tenazas o mordazas BJ para revestimientos y rotativos bien pesados, son muy firmes, seguras y cómodas para el manejo de tubería de perforación y revestimientos.
8. El escariador Perfection BJ, desde hace muchos años, goza de la reputación de ser el más eficaz en su aplicación a herramientas de cable.
9. Los ganchos de varillas y los elevadores de varillas BJ forman una combinación superior. No hay peligro y el trabajo resulta más fácil y rápido.
10. Los elevadores de varillas BJ tienen cuerpos de una sola pieza y están tratados al calor. Convenientes para abrirse o cerrarse por delante o por detrás.
11. Las tenazas de extremo abierto BJ son livianas y fáciles de colocar en la tubería donde quedan bien afirmadas.
12. Las tenazas Snapon BJ se cierren en la tubería. Son firmes y su empleo es muy seguro en tuberías de gran diámetro.

BYRON JACKSON CO.
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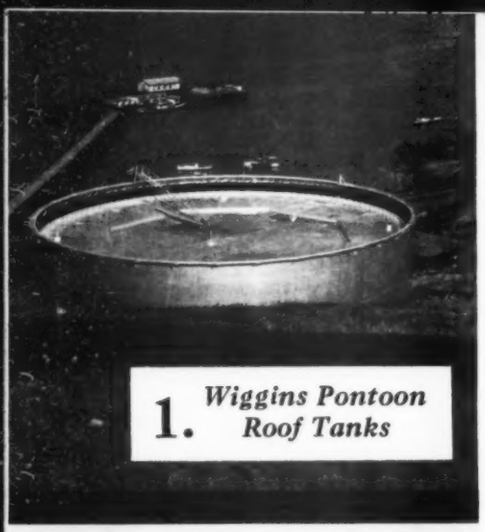
BJ

MEMBER

DRILLING AND PRODUCTION TOOLS

BJ Drilling and Production Tools
Outils de forage et de production BJ.
Herramientas de perforación y producción

BJ Drilling and Production Tools
Outils de forage et de production BJ.
Herramientas de perforación y producción



1. *Wiggins Pontoon Roof Tanks*

Helping the World's Oil Industry to Reduce Evaporation Expenses

The benefits offered by the Horton line of evaporation reducing equipment are available to all branches of the oil industry. Regardless of where your interests are located, it is entirely practical for you to establish the same high standard for efficiency in handling and storing oil as you would for most favored locations. As illustrated on this page, the following exclusive products are included in the Horton line:

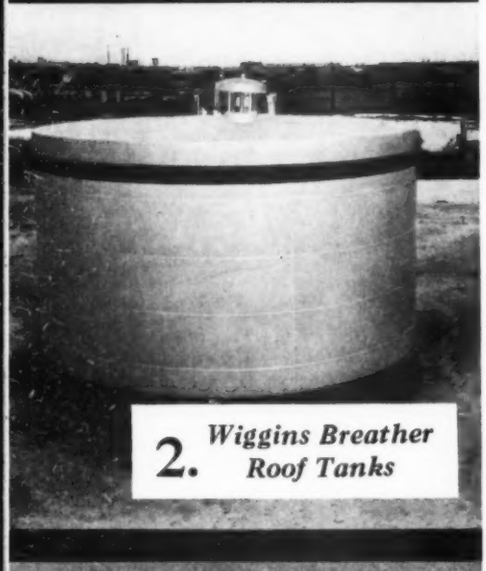
1. Wiggins Pontoon Roof Tanks. Recommended for working tanks on all grades of oil that do not boil at ordinary atmospheric temperatures.

2. Wiggins Breather Roof Tanks. Especially suited for holding oil in standing storage.

3. The Hortonsphere. For storing gases and volatile liquids at pressures of 20 lbs. per sq. in. and up.

4. The Hortonspheroid. Recommended for pressure storage of oil where pressure does not exceed 20 lbs. per sq. in. gage.

5. The Wiggins Balloon. A large capacity, low cost gas holder widely adaptable to interconnected vapor saving systems.



2. *Wiggins Breather Roof Tanks*

Nous aidons l'industrie pétrolière du monde à réduire les pertes d'évaporation

Les avantages offerts par la série Horton de matériel réducteur d'évaporation sont à la portée de toutes les branches de l'industrie du pétrole. Où que se trouvent vos exploitations, il vous est possible de réaliser le même standard élevé d'efficacité dans la manutention et le magasinage du pétrole que vous l'obtiendriez dans les endroits les plus favorisés. Ainsi qu'il ressort des gravures ci-contre, la série Horton comprend les produits exclusifs qui suivent:

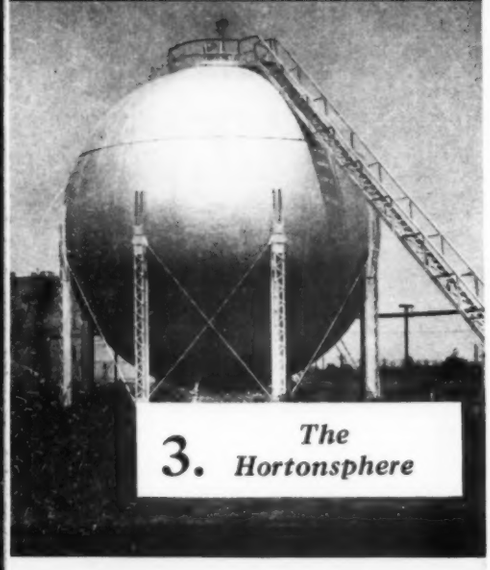
1. Réservoirs Wiggins à toit ponton. Recommandés comme réservoirs en service pour toutes qualités de pétroles ne bouillant pas aux températures atmosphériques ordinaires.

2. Réservoirs Wiggins à toit renflard. Convenant spécialement à la conservation des pétroles en magasinage au repos.

3. Le Hortonsphére. Pour le magasinage des gaz et liquides volatiles sous des pressions de 20 lbs. par pouce carré et au-dessus.

4. Le Hortonsphéroïde. Recommandé pour le magasinage sous pression des pétroles dans les cas où la pression ne dépasse pas 20 lbs. au pouce carré.

5. Le Ballon Wiggins. Un récipient pour gaz, de grande capacité et de bas prix, se signalant par sa grande adaptabilité aux systèmes conjugués économiseurs de vapeurs.



3. *The Hortonsphere*

Ayudamos a la industria petrolera del mundo a reducir las pérdidas de evaporación

Las ventajas ofrecidas por el surtido Horton de material reductor de evaporación están al alcance de todas las ramificaciones de la industria del petróleo. No importa donde estén sus explotaciones, ahora puede Ud. establecer la misma norma elevada de eficacia en el manejo y almacenaje del petróleo, que Ud. tendría a su disposición en los lugares más favorecidos. Como lo muestran los grabados en esta página, el surtido Horton comprende los siguientes productos exclusivos:

1. Tanques Wiggins de techo de pontón. Se recomiendan como tanques de servicio para toda clase de petróleo que no hierve a las temperaturas atmosféricas ordinarias.

2. Tanques Wiggins de techo de respiradero. Muy convenientes, especialmente para la conservación de petróleos dejados en depósito o reposo.

3. El Hortonesfera. Para el almacenaje de gases y liquidos volátiles a presiones de 20 libras por pulgada cuadrada y más.

4. El Hortonesferoide. Recomendado para el almacenaje bajo presión de petróleos, en aquellos casos en que la presión no pass de 20 libras por pulgada cuadrada.

5. El Globo Wiggins. Un recipiente para gas, de gran capacidad y de bajo precio, que se caracteriza por su gran adaptabilidad a los sistemas economizadores de vapor interconectados.

CHICAGO BRIDGE & IRON CO.

EXPORT OFFICE: 3147-165 Broadway Bldg., New York City, N. Y.
FABRICATING PLANTS in Birmingham, Chicago, and Greenville, Pa.

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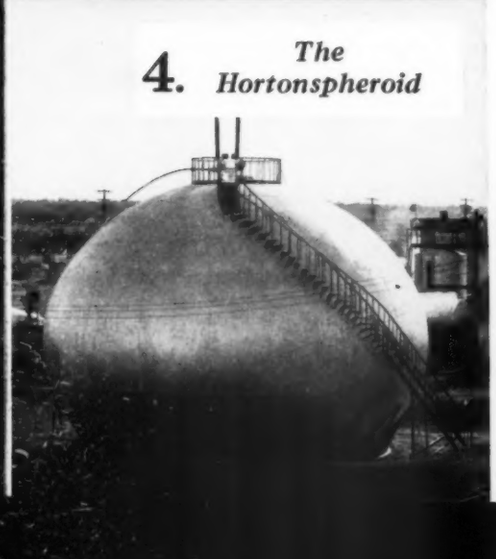
Motherwell Bridge & Engineering Co., Ltd., Motherwell, Scotland
Whessoe Foundry & Engineering Co., Ltd., Darlington, England.

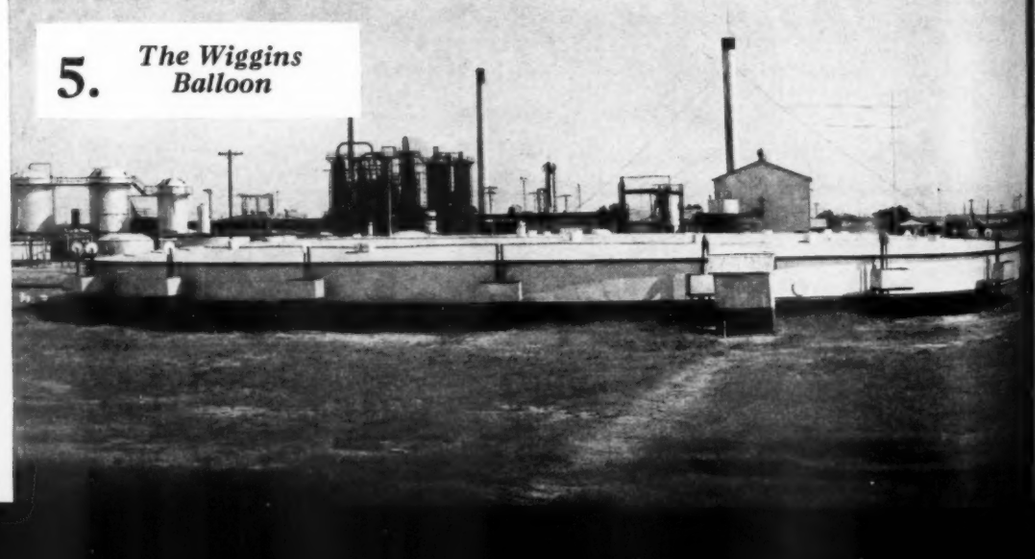
FRANCE
Worms & Cie., Le Trait, France

CANADA
Horton Steel Works, Ltd., Fort Erie, Ontario Canada

ITALY
Compagnia Tecnica Industrie Petrolie S. A. I. Milan, Italy.



4. *The Hortonspheroid*



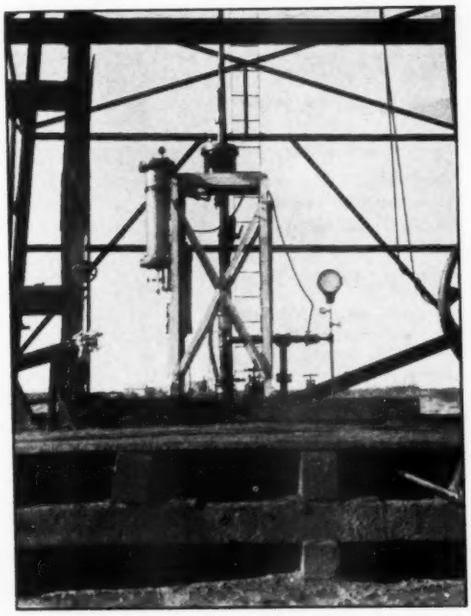
5. *The Wiggins Balloon*

(Continued from Page 192)

gas may be produced, or mud or cement forced back of the casing.

This device has led to a departure from ordinary methods of completing gas or oil wells and has been very useful in opening old formations previously shut off when the strings of casing were run to complete the wells at lower depths.

If it is necessary to cement behind the casing a packer is run to a point below the place where cement is to be introduced and a second packer then run on a string of tubing or drill pipe to some point higher in the casing. The casing has been previously perforated with a series of holes above the place where the lower packer is set and a second set of holes above the upper packer. Cement, or mud, may then be pumped into the space between the two packers and will find its way out behind the casing through the lower set of perforations. When this cement finds exit into the casing above, the upper packer pump pressures are lowered and the cement job stopped. The upper and lower packers are then removed and the operation may be repeated at regular intervals up the hole as desired.



Pumping well

The gun perforator is also used to puncture the casing when it is desired to produce a formation behind the casing. One way to complete a well is to run the casing to the bottom of the hole and then shoot the casing to admit the gas or oil. In this manner it is possible to case off several sands and produce them one at a time in any predetermined order, usually from the bottom upward. Or one producing formation can be treated in this manner and in handling high pressures the well can be kept under control at all times. Carbon dioxide gas wells have been so finished and brought in without freezing up as they usually do when completed in the conventional manner.

HEAVING SHALES

About the only fact upon which all interested seem to agree concerning "heaving shale" is that it can cause a lot of trouble and expense when encountered in a rotary drilled hole. Numerous analyses of the so-called heaving shale have been made and it has been reported as highly bentonitic or classified as normal shale under high compression forces but all agree it has a great affinity for water. This theory is modified by some experi-

(Continued on Page 204)

(Continué de Page 192)

scend dans le puits à l'intérieur du revêtement et qu'on amène exactement en face de la section qu'on se propose de perforer. L'explosif est déchargé par un courant électrique contrôlé par des commutateurs prévus sur un camion de construction spéciale à proximité du puits. Ces balles traversent le revêtement et pénètrent dans la formation par l'arrière, pratiquant ainsi une série de trous par lesquels on peut extraire le pétrole ou le gaz, ou par le moyen desquels on peut refouler les boues ou les ciments derrière le revêtement.

Ce dispositif a amené à s'écarter des méthodes ordinaires d'aménagement des puits à gaz ou à pétrole, et s'est montré des plus utiles pour rouvrir d'anciennes formations précédemment fermées lorsque les rangées de revêtements avaient été posées pour achever les puits à de moindres profondeurs.

S'il est nécessaire de cimenter derrière le revêtement, on descend un bourrage à un point inférieur à l'endroit où le ciment doit être introduit, puis on descend un second bourrage sur un faisceau de tubage ou un tuyau de forage jusqu'à un point supérieur du revêtement. Au préalable, on a pratiqué dans le revêtement une série de trous au-dessus de l'endroit où le bourrage inférieur est posé et une seconde série de trous au-dessus du bourrage supérieur. On peut alors pomper des ciments ou des boues dans l'espace restant entre les deux bourrages, et ces ciments ou boues parviendront jusque derrière le revêtement en passant par la série inférieure de perforations. Lorsque ce ciment trouve moyen de sortir du revêtement par au-dessus, on baisse les pressions de pompe du bourrage supérieur et on interrompt l'introduction du ciment. On sort alors les bourrages inférieur et supérieur et on peut répéter l'opération à intervalles réguliers en remontant le puits, si on le desire.

Le perforateur-pistolet s'emploie aussi pour pratiquer des perforations dans le revêtement lorsqu'on désire exploiter une formation située derrière le revêtement. Une méthode pour achever un puits consiste à descendre le revêtement jusqu'au fonds du puits, puis tirer dans le revêtement pour laisser entrer le gaz ou le pétrole. De cette manière, il est possible de pratiquer l'extraction de plusieurs sables, à raison de un à la fois dans tout ordre qu'on se sera donné au préalable, en général en procédant de bas en haut. Ou encore on peut traiter de cette manière un seul gisement producteur, et, lorsqu'on rencontre de fortes pressions, on reste à tout moment maître de l'extraction du puits. Les puits à gaz contenant du gaz carbonique sont maintenant aménagés et exploités sans qu'on ait lieu de craindre la congélation, ce qui se produit généralement lorsque les puits sont aménagés de la manière courante.

SOULEVEMENT DE SCHISTES

A peu près le seul fait au sujet duquel tous les intéressés sont d'accord concernant le "soulèvement de schistes," c'est qu'il est une source de bien des ennuis et bien des frais lorsqu'il se présente dans un trou foré au rotatif. On a fait de nombreuses analyses des schistes dites de soulèvement, et on les a classés comme des schistes fortement bentoniques ou comme des schistes normaux soumis à des forces de haute compression, mais tous s'accordent à dire qu'ils ont une grande affinité pour l'eau. Cette théorie est modifiée par certains foreurs expérimentés qui prétendent qu'il est nécessaire que le schiste soit rempli de gaz avant de donner un soulèvement.

Une autre théorie partage le point de vue que le schiste de soulèvement est causé par du pétrole sous de hautes pressions qui se trouverait dans des réservoirs non reliés avec la circulation hydrostatique générale. Ces schistes semblent toujours être associés avec des sections mues par des tam-

(Continué sur Page 204)

(Continué de Página 192)

traerse el gas o el petróleo, o forzarse barro o cemento detrás del revestimiento.

Este nuevo aparato ha conducido a una innovación en los métodos ordinarios de completar pozos de gas o de petróleo, y ha resultado muy útil en abrir formaciones antiguas, anteriormente cerradas o tapadas por la instalación de revestimiento a mayores profundidades.

Cuando es necesario cementar detrás del revestimiento, se introduce un obturador hasta un punto debajo de la sección que ha de cementarse, y luego se introduce otro obturador en un tubo corriente o de perforación, hasta un punto arriba de esa sección. El revestimiento ha sido anteriormente perforado con una serie de agujeros arriba del punto donde se ha fijado el obturador inferior, y también arriba del punto donde se ha fijado el obturador superior. Puede ahora inyectarse cemento o barro, con la ayuda de una bomba, dentro del espacio comprendido entre los dos obturadores. El material se escurre por los agujeros inferiores, quedando detrás del revestimiento. Cuando el cemento o barro empieza a regresar y entrar al revestimiento, por las perforaciones superiores, se reduce entonces la presión de la bomba sobre el obturador superior y se para el trabajo. Se quitan ahora el obturador superior y el inferior, y el trabajo puede repetirse, a intervalos regulares, en cualquiera extensión del hoyo.

La pistola perforadora se emplea también para abrir el revestimiento cuando se desea producir una formación detrás del revestimiento. Una manera de completar el pozo es correr el revestimiento hasta el fondo del hoyo y en este punto, abrir el revestimiento, con la pistola, para admitir el gas o el petróleo. De esta manera, resulta posible tratar varios hoyos, repitiendo el procedimiento en un orden predeterminado, y empezando generalmente del fondo para arriba. Por otra parte, la formación productiva puede tratarse de esta manera, y al tratarse de altas presiones, el pozo puede mantenerse así bajo control durante todo el tiempo. De esta manera se han terminado muchos pozos de gas de bióxido de carbono, sin sufrir la extinción que de ordinario se presenta a su terminación, siguiendo el método corriente.

FALLA DE LOS ESQUISTOS

Casi el único hecho sobre el cual están de acuerdo los interesados, en lo tocante a la falla o desplazamiento de los esquistos, es que ésto es fuente de muchas molestias y grandes gastos, cuando se presente en un pozo perforado con rotativa. Se ha hecho un gran número de análisis de los esquistos sujetos a falla o desplazamiento, y se les ha clasificado como esquistos decididamente bentónicos o como esquistos normales, sometidos a fuerzas de alta compresión; pero, todos están de acuerdo en declarar que tienen una gran afinidad por el agua. Esta teoría ha sido modificada por ciertos perforadores de experiencia, quienes aseguran que es necesaro que el esquisto se llene de gas antes de presentar falla o desplazamiento.

Otra teoría avanza el punto de vista de que la falla del esquisto es causada por pequeñas acumulaciones de petróleo, bajo altas presiones, que no están conectadas con la circulación hidrostática general. Estos esquistos parecen estar siempre associacos a secciones movidas por tapones de sal, en las cuales se han concentrado fuerzas extraordinarias, que se ponen súbitamente en libertad, tan pronto como la perforación penetra la formación.

Se ha empleado con éxito el silicato de sodio y la sal, con barro, y manteniendo grandes presiones contra los esquistos, durante la perforación, se ha logrado penetrarlos sin incidente y facilitado la colocación del revestimiento. Por otra parte, se

(Continué en Página 204)

OBTENGA UD. UNA MEJOR ESCARIACION A MENOS COSTO MEDIANTE LOS ESCARIADORES SIEVERS

Esta excelente herramienta escariadora y estabilizadora, se basa sobre un principio completamente nuevo de montaje, construcción y funcionamiento, en virtud del cual se obtienen mejores resultados, lográndose, al mismo tiempo, notables economías en los gastos de explotación.

LO QUE HACE

1. Acondiciona el hoyo de perforación a la colocación del revestimiento.
2. Estabiliza la barrena de perforación.
3. Reduce el costo por pié trabajado.
4. Permite un mejor levantamiento de muestra.
5. Asegura un máximo de seguridad para el pozo y el material.

COMO LO HACE

1. Los cortadores o fresas están montados en el cuerpo del escariador en un ángulo que les permite atacar a la formación con una acción cortante, dirigida hacia abajo. La barrena no se retarda, sino que escair así un agujero de diámetro completo, con menos esfuerzo y con menos peso en el cable de perforación, y todo esto en menos tiempo que con los tipos ordinarios de escariadores. Se puede entonces proceder con facilidad a la descensión del revestimiento, sin consideración de las tolerancias o profundidad.

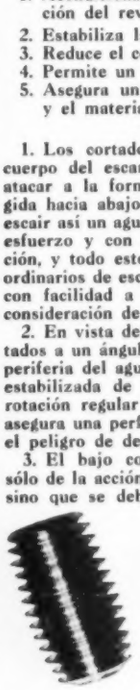
2. En vista del hecho de que estos cortadores, montados a un ángulo, hacen contacto con 25 a 35% de la periferia del agujero, la barrena de perforación queda estabilizada de una manera eficaz. Resulta así una rotación regular y concéntrica de la barrena, lo que asegura una perforación rectilínea y reduce al mínimo el peligro de desviaciones.

3. El bajo costo por metro escariado resulta no sólo de la acción cortante rápida del escariador Sievers, sino que se debe también a su proyecto y su construcción exclusivas, que reducen notablemente el desgaste de los soportes de los cortadores, cuerpo del escariador y todas las piezas de movimiento.

4. La acción estabilizante de los cortadores tiene también el efecto de centrar la acción del cañón o tubo sacador de muestras, asegurándole una rotación exacta sobre su eje y permitiéndole extraer de toda formación un mayor porcentaje de muestras, particularmente al tratarse de estratas o capas blandas o quebradas.

5. Un dispositivo de cierre patentada ancla los soportes principales de los cortadores del escariador Sievers, en el interior del cuerpo, lo que impide, de una manera positiva, que estos soportes giren o se salgan de sus puntos de sujeción. De este modo, se elimina el desgaste excesivo, las roturas costosas, las reparaciones y las pérdidas de piezas, todo lo cual asegura un máximo de seguridad en el trabajo.

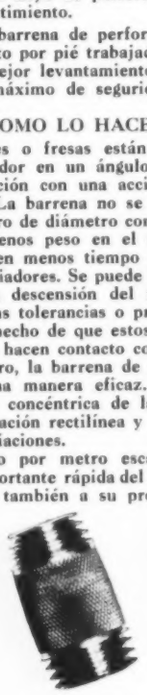
A solicitud enviaremos gustosamente catálogo ilustrado, que describe en detalle las características de construcción y de funcionamiento de los escariadores Sievers y de las válvulas Security. Pídanos un ejemplar ahora mismo.



Cortador o fresa normal que suministramos, a menos que se especifique lo contrario.

Standard Cutter, furnished unless otherwise specified.

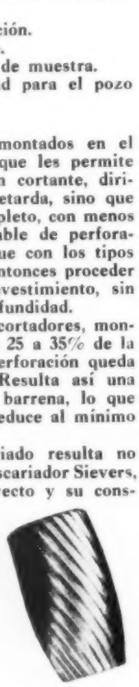
Fraise standard fournie à moins de spécifications contraires.



Fresa de rodillo estriado, para la estabilización de la barrena en formaciones blancas.

Knurled Roller Cutter, for bit stabilization in soft formations.

Fraise à rouleau moleté pour stabilisation du trépan en formations molles.



Fresa con estrías en espiral, que se emplea únicamente para la escariación de roca dura y para la estabilización de la barrena.

Spirally fluted cutter, used only for hard rock reaming and bit stabilization.

Fraise à cannelures en spirale, ne s'employant que pour alésage en roc dur et pour stabilisation du trépan.

ASSUREZ-VOUS UN MEILLEUR ALESAGE A MOINS DE FRAIS AU MOYEN DE L'ALESOIR SIEVERS

L'outil aléseur et stabilisateur ci-contre, d'un emploi général, est d'un principe entièrement nouveau de montage, de construction et de fonctionnement, grâce auquel on obtient de meilleurs résultats tout en réalisant des économies marquées sur les frais d'exploitation.

CE QU'IL ACCOMPLIT

1. Conditionne le trou de forage en vue de la pose du revêtement.
2. Stabilise le trépan de forage.
3. Abaisse le prix de revient par unité de longueur.
4. Permet un meilleur prélèvement de carotte.
5. Assure un maximum de sécurité pour le puits et le matériel.

COMMENT IL L'ACCOMPLIT

1. Les lames sont montées dans le corps de l'alésoir sous un angle, de manière à attaquer la formation avec une action tranchante ou cisaillante, dirigée vers le bas. Le trépan n'est pas retardé, et on alèse ainsi un trou régulièrement à la cote avec moins d'effort, moins de poids sur le câble de foret, et cela en moins de temps qu'au moyen des types ordinaires d'alésoirs. On peut alors procéder avec aisance à la descente du revêtement, quelles que soient les tolérances ou la profondeur.

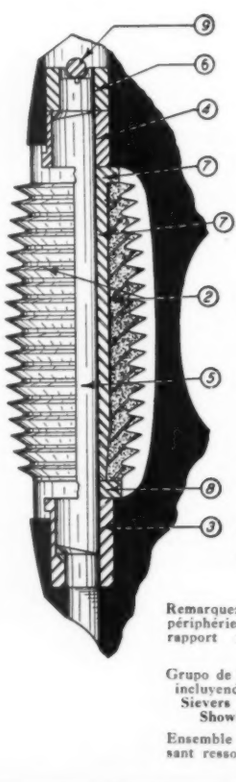
2. Par suite du fait que ces lames, montées sous un angle, prennent contact avec de 25 à 35% de la périphérie du trou, le trépan de forage est stabilisé d'une manière efficace. Il en résulte une rotation régulière et concentrique du trépan, ce qui assure un forage rectiligne et réduit au minimum le risque de déviations.

3. Le bas prix de revient par unité de longueur alésée ne tient pas seulement à l'action coupante rapide de l'alésoir Sievers, mais est dû aussi à son tracé et à sa construction exclusifs qui réduisent fortement l'usure des tétons de lames, du corps de l'alésoir et de toutes les pièces mobiles.

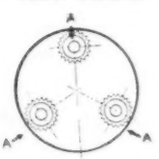
4. L'action stabilisante des lames a aussi pour effet de centrer l'action du baril carottier, ce qui en assure la rotation sur son axe exact et permet de prélever dans toutes les formations une carotte d'un meilleur pourcentage—en particulier lorsqu'il s'agit de couches molles ou brisées.

5. Un dispositif de verrouillage breveté ancre les tétons ou ergots principaux de l'ensemble alésoir Sievers à l'intérieur du corps d'alésoir proprement dit, ce qui empêche d'une manière positive les ergots de tourner ou de sortir de leurs logements. De cette manière, on élimine l'usure excessive, les ruptures onéreuses, les réparations ou pertes de pièces, tout en assurant un maximum de sécurité dans l'opération.

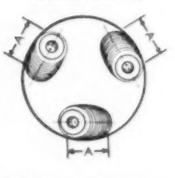
Sur demande, nous vous ferons parvenir un catalogue illustré qui décrit en détail les caractéristiques de construction et de fonctionnement des alésoirs Sievers et des soupapes Security. Demandez-nous en un exemplaire dès aujourd'hui.



Escariador corriente.
Ordinary Reamer
Alésoir ordinaire.



Escariador Sievers.
Sievers Reamer
Alésoir Sievers.



Obsérvese la gran proporción de periferia de hoyo en contacto, en comparación de periferia de hoyo los escariadores ordinarios.

Note the large amount of hole circumference contacted as compared with ordinary reamers.

Remarquez la forte proportion de périphérie du trou en contact par rapport sau contact des alésoirs ordinaires.

Grupo de fresa del escariador Sievers, incluyendo el dispositivo de cierre.
Sievers Reamer Cutter Assembly Showing Locking Device.

Ensemble fraise d'alésoir Sievers faisant ressortir le dispositif de verrouillage.

SECURE BETTER REAMING FOR LESS MONEY WITH THE SIEVERS REAMER

This successful reaming and stabilizing tool embodies an entirely new principle of design, construction and operation which assures better results at substantial savings in operating costs.

WHAT IT DOES

1. Conditions the hole for setting casing.
2. Stabilizes the drilling bit.
3. Lowers footage costs.
4. Permits better core recovery.
5. Affords maximum safety to well and equipment.

HOW IT DOES IT

1. Cutters are set in the reamer body at an angle, attacking the formation with a downward, slicing or shearing action. The bit is not retarded and a full gauge hole is reamed with less effort, less weight on the drill string and in less time than with ordinary types of reamers. Casing is thus permitted to be set freely regardless of depth or tolerances.

2. Because these cutters, set at an angle, contact from 25 to 35% of the circumference of the hole, the drilling bit is effectively stabilized. Smooth, concentric bit rotation results, affording straight hole drilling and minimizing danger of "twist-offs."

3. Low footage costs result not only from the fast cutting action of the Sievers Reamer, but also from its exclusive design and construction which materially reduces wear on cutter pins, reamer body and all moving parts.

4. The stabilizing action of the cutters also serves to center the action of the core barrel, thus assuring rotation on its true axis, and permitting a higher percentage of core recovery in all formations—particularly in soft or broken strata.

5. A patented locking device anchors the main pins of the Sievers Reamer assembly within the reamer body proper, positively preventing the pins from rotating or becoming dislodged. Excessive wear, with costly breakage, repairs or loss of parts is thus eliminated and maximum safety of operation assured.

An illustrated catalog describing in detail the construction and operating features of Sievers Reamers and Security Valves will be sent upon request. Write for your copy today.

Escariador Sievers—grupo completo.

Sievers Reamer—Complete Assembly.

Alésoir Sievers—Ensemble complet

Security Engineer in

SIEVERS REAMERS

WHITTIER, CALIFORNIA
Export Office: 420 Lexington Ave
New York City

SECURITY VALVES WILL BRING YOU MAXIMUM VALVE EFFICIENCY

LES SOUPAPES SECURITY VOUS ASSURERONT UN RENDEMENT MAXIMUM

LAS VALVULAS SECURITY LE ASEGURAN UN RENDIMIENTO MAXIMO

The Security Slush Pump Valve has proved its merit in actual field service under the most severe operating conditions. Its exclusive working principle and construction result in "Valve Efficiency at Its Best."

As experienced operators know, the terrific impact of valves on seats, and the abrasive wear on the sealing surfaces of the valve seats, are the principal destructive forces which cause premature valve failures and necessitate frequent shut-downs for repairs and costly parts replacements.

OPERATION OF VALVE

In operation, the Valve Stem (2) remains stationary as an integral part of the Valve Seat (1). The valve assembly (parts 6, 7, 8) moves on the Stem Sleeve (4) between the limits of the Stem Nut (7) at the top of the lift and the Impact Washer (3) at the bottom of the lift. A positive fluid seal is formed between the Rubber Insert and the Stem Sleeve, since the Top Plate is free to move downward in the slots of the Bottom Plate posts as pressure is applied to the upper surface, thus causing the Rubber Insert to be compressed around the Stem Sleeve.

In Security Slush Pump Valves, the impact is not taken by the sealing surface of the valve seat, but by an Impact Washer (3) backed by a strong bridge (7) across the bottom of the valve seat (1). Sealing is effected by the concave curved surface of the rubber insert (6) contacting the convex curved surface of the valve seat. This efficient design not only eliminates all pounding action of the valve on the sealing surface, but also minimizes the abrasive wear and tendency toward cutting of metal and by-passing when rock or metal fragments pit or damage the valve seat, such as occurs in the case of ordinary types of valves.

Mostramos aquí el firme soporte y el vástago de la válvula formando cuerpo con el asiento.

Showing strong bridge and Valve Stem as part of seat.

On voit qu'on fort pontet et la tige de soupape font corps avec le siège.

The Security Slush Pump Valve has these proved advantages:

Wear by the valve stem in the seat cross bar is entirely eliminated, thus increasing the life of the valve seat. Valve Stem Guide Bushings are not required. A positive method is provided for securing a pre-determined and constant valve lift. It is unnecessary to stock several types and designs of valve stems to fit pumps of various makes which have the same general valve seat. In the Security Valve, a replaceable valve stem sleeve takes the wear which ordinarily is assumed by the Valve Stem. Wear at this point from the reciprocating movement of the valve upon the stem is practically eliminated. Construction of the Valve Seat of finest forged steel, heat treated, assures long life. Rubber Insert and other wearing parts are inexpensive to replace and can be changed quickly without use of special tools.

La soupape Security de pompe à boues a fait ses preuves en service au chantier même, et cela dans les conditions les plus dures d'exploitation. Le principe exclusif de sa construction et de son fonctionnement se traduit par un "rendement maximum de soupapes."

Ainsi que les exploitants expérimentés le savent, le choc terrible des soupapes venant en contact avec leurs sièges, ainsi que l'usure abrasive qui se produit sur les surfaces d'étanchéité des sièges de soupapes, sont les principaux facteurs destructifs en jeu ici, ce qui entraine la fin prématurée des soupapes et occasionne de fréquents arrêts dans le travail afin de procéder aux réparations et faire des remplacements coûteux de pièces.

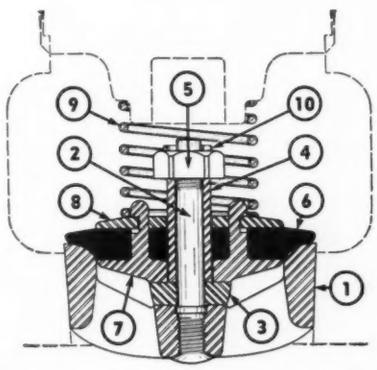
FONCTIONNEMENT DE LA SOUPAPE

Pendant le fonctionnement, la tige de soupape (2) reste fixe comme pièce faisant corps avec le siège de soupape (1). L'ensemble soupape (pièces 6, 7, 8) se déplace sur le fourreau de la tige (4) entre les limites de l'écrou de tige (7) au sommet de la levée et la rondelle de choc (3) à la base de la levée. Un joint liquide positif se forme entre la pièce rapportée de caoutchouc et le fourreau de tige, étant donné que la plaque de haut est libre de se déplacer vers le bas dans les rainures des montants de la plaque du bas lorsqu'on applique la pression sur la surface supérieure, de sorte que la pièce rapportée en caoutchouc se trouve comprimée autour du fourreau de tige.

Dans le cas des soupapes Security de pompe à boues, le choc n'est pas reçu par la surface étanchéifiante du siège de soupape, mais par une rondelle de choc (3) qui prend appui sur un fort pontet (7) disposé en travers de la base du siège de soupape (1). L'étanchéité se réalise par la prise de contact de la surface à courbure concave de la pièce rapportée de caoutchouc (6) avec la surface à courbure convexe du siège de soupape. Non seulement ce montage efficace élimine tout cognement de la soupape sur la surface étanchéifiante, mais encore il supprime l'usure abrasive et la tendance à entailler le métal et à mettre en dérivation lorsque des fragments de roc ou de métal piquent ou abîment le siège de soupape, ce qui est fréquent dans le cas des types ordinaires de soupapes.

La soupape Security de pompe à boues possède les avantages démontrés qui suivent:

L'usure causée par la tige de soupape dans la barre transversale du siège se trouve complètement éliminée, ce qui augmente la vie utile du siège de soupape. On n'a pas besoin d'employer de coussinets de guide de tige de soupape. Un mécanisme positif est prévu pour assurer une levée de soupape constante, fixée à l'avance. Il est inutile de tenir en stock plusieurs types et modèles de tiges de soupape pour s'adapter à des pompes de diverses marques qui ont le même siège de soupape général. Dans la soupape Security, un fourreau remplaçable de tige de soupape prend l'usure qui est ordinairement prise par la tige de soupape. En ce point, l'usure causée habituellement par le mouvement alternatif de la soupape sur la tige est quasi-éliminée. Le siège de soupape étant en acier forgé de choix, traité thermiquement, il en résulte une longue vie utile. La pièce rapportée de caoutchouc et les autres pièces subisant l'usure sont bon marché à remplacer et peuvent se changer rapidement sans qu'on doive avoir recours à des outils spéciaux.



Vista seccional del grupo de válvula instalado en la bomba.

Sectional view showing complete valve assembly in pump.

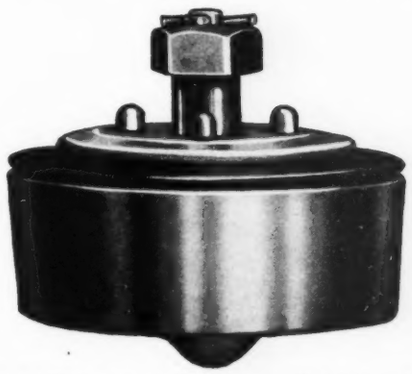
Vue en coupe montrant l'ensemble soupape complet dans la pompe.

La válvula Security de bomba de barro ha comprobado sus méritos en servicio práctico de campo petrolífero, bajo la más difíciles condiciones de explotación. El principio exclusivo de su construcción y de su funcionamiento se traduce por un "rendimiento máximo de válvula".

Todos los explotadores de experiencia saben que el tremendo choque de las válvulas, al hacer contacto con sus sientos, lo mismo que el desgaste por rozamiento, que se produce en las superficies de cierre de los asientos de las válvulas, son los principales factores de destrucción que se presentan aquí, y que causan la deshabilitación prematura de las válvulas, ocascionando frecuentes paralizaciones de trabajo, para hacer las reparaciones del caso mediante costosas piezas de repuesto.

FUNCIONAMIENTO DE LA VALVULA

Durante el funcionamiento, el vástago de la válvula (2) queda fijo como pieza integrante del asiento de la válvula (1). El grupo de válvula (piezas 6, 7, 8) se desplaza sobre el manguito del vástago (4) entre los límites de la tuerca de vástago (7) en la parte superior del levantamiento y la arandela de choque (3) en la base del levantamiento. Un cierre líquido positivo se forma entre la pieza de caucho insertada y el manguito del vástago, a



Grupo de válvula en su asiento. No hay necesidad de herramientas para reemplazer la pieza de caucho insertada entre las placas metálicas.

Valve Assembly on Seat. No tools are required to replace rubber insert between metal plates.

Ensemble soupape sur siège. On n'a pas besoin d'outils pour remplacer la pièce rapportée en caoutchouc entre les plaques de métal.

causa de que la placa de arriba queda libre para desplazarse hacia abajo mientras se aplica la presión a la superficie superior, de modo que la pieza de caucho insertada queda así comprimida alrededor del manguito del vástago.

En el caso de las válvulas Security de bomba de barro, el choque no es recibido por la superficie de cierre del asiento de la válvula, sino por una arandela de choque (3) apoyada sobre un firme soporte (7) dispuesto transversalmente en la base del asiento de la válvula (1). El cierre hermético se realiza mediante el contacto de la superficie de curva cóncava de la pieza de caucho insertada (6) con la superficie de curva convexa del asiento de la válvula. Este eficaz montaje no sólo elimina todo violento golpeteo de la válvula sobre la superficie de cierre, sino que suprime también el desgaste por rozamiento y la tendencia hacia dañar el metal, produciendo escape, cuando los fragmentos de roca o de metal pican o dañan el asiento de la válvula, cosa que sucede con frecuencia en las válvulas de tipos ordinarios.

La válvula Security de bomba de barro posee las siguientes ventajas comprobadas:

El desgaste causado por el vástago de la válvula sobre la barra transversal del asiento, se elimina por completo, lo que aumenta la duración útil del asiento de la válvula. No hay necesidad de emplear bujes de guía de vástago de válvula. Se ha provisto un mecanismo positivo para asegurar un levantamiento de válvula constante, fijado de antemano. No hay necesidad de tener en existencia varios tipos y modelos de vástagos de válvula, para la adaptación a bombas de diversas marcas que tienen el mismo asiento general de válvula. En la válvula Security, un manguito reemplazable de vástago recibe el degaste que ordinariamente recae en el vástago de la válvula. En este punto, el desgaste causado ordinariamente por el movimiento alternativo de la válvula sobre el vástago queda casi suprimido. El asiento de la válvula, que es de fino acero forjado, tratado térmicamente, resulta así muy durable. La pieza de caucho insertada y las demás piezas expuestas a desgaste pueden reemplazarse económicamente, instalandose con facilidad, sin necesidad de recurrir a herramientas especiales.

ing Company

WHITTIER, CALIFORNIA

Export Office: 420 Lexington Ave., New York City

SECURITY VALVES

New Ideal Pipe Cleaning Machines

Typical Scene New Ideal Model "'B" Hi-Speed Duo-Hydraulic Pipe Straightener (left) and New Ideal Master De-Luxe Model Pipe Cleaning Machine in operation.

Scène typique: Machine à redresser les tuyaux (à gauche), duo-hydraulique et de grande vitesse, New Ideal Modèle "B", et machine à nettoyer les tuyaux New Ideal Modèle Master de luxe, en service.

En esta típica escena mostramos el modelo "B" de enderezadora de tubos New Ideal Hi-Speed Duo-Hydraulic (a la izquierda) y el modelo De-Luxe de máquina limpiadora de tubos New Ideal en funcionamiento.

Remove Dirt, Rust, Scale and Corrosion

The New Ideal Pipe Cleaning Machines, combining engineering research, manufacturing skill and practical field experience, have brought an important development in this line of equipment. They are sturdily constructed units for the rapid, efficient, economical removal of dirt, rust, scale and corrosion from the surface of pipe and casing. Made in three models and several sizes to meet the specific needs of oil and gas companies, pipe lines, utilities and pipe yards.

Enlévent saleté, rouille, incrustation et corrosion

Les machines à nettoyer les tuyaux New Ideal, le résultat combiné des recherches techniques, de l'habileté en fabrication et de l'expérience pratique au chantier, ont marqué un progrés important dans ce genre de matériel. Ce sont des groupes robustes, prévus pour enlever rapidement, efficacement et économiquement la saleté, la rouille, les incrustations et la corrosion de la surface des tuyaux et des revêtements. Il en est prévu trois modèles et plusieurs tailles afin de répondre aux divers besoins des compagnies de pétrole et de gaz, de pipe-lines, d'utilités et chantiers de conduites.

Quita la tierra, moho, costra y corrosión

Las máquinas New Ideal de limpiar tubería, que combinan estudios técnicos, habilidad manufacturera y experiencia práctica en el campo, representan un importante perfeccionamiento en su respectivo ramo. Son máquinas de muy firme construcción, especialmente proyectadas para quitar, con suma rapidez y economía, la tierra, moho, costra y corrosión de la superficie de tubos y revestimientos. Se ofrecen en tres modelos y en varios tamaños, para satisfacer los requisitos particulares de compañías de petróleo y de gas, sistemas de distribución o transporte, empresas de utilidad pública y establecimientos de tuberías.

All Machines Patented and Equipped With

Gear-driven Brushing Attachment; Removable Reversible Blades; Safety Automatic Self-Locking Guide Handle; Dual Hi-Speed Guide Rollers; Four Auxiliary Stands; Dust-Proof Bearings; Steel Channel Frames, Cross Braced; Pressure Lubricated; Guns Furnished. All models 25 feet long; 32 inches wide; frame height 26 inches. Each model has several exclusive features; designed for easy portability or stationary use.

Toutes machines brevetées et équipées avec

accessoire de brossage à commande à engrenages; lames réversibles et amovibles; poignée-guide automatique de sûreté à auto-verrouillage; galets-guides doubles de grande vitesse; quatre supports auxiliaires; paliers à l'abri de la poussière; châssis en poutrelle d'acier, avec entretoises; graissage sous pression; seringues prévues. Tous les modèles ont 25 pieds de long, 32 pouces de large et 26 pouces de hauteur de châssis. Chaque modèle a plusieurs avantages exclusifs; prévu de type facilement portable ou de type fixe.

Todas las máquinas están patentadas y equipadas con

Aditamiento de barrer accionado por engranajes; cuchillas reversibles amovibles; mango guiador de cierre automático de seguridad; rodillos guiadores dobles de alta velocidad; cuatro soportes auxiliares; conjinetes protegidos contra el polvo; armazón de acero acanalado con refuerzos transversales; lubricación bajo presión, incluyendo las pistolas de engrase. Todos los modelos tienen 25 pies de longitud, 32 pulgadas de anchura, con armazón o bastidor de 26 pulgadas de altura. Cada modelo se caracteriza por varios rasgos exclusivos. Todos se prestan a fácil transporte y a servicio en instalaciones fijas.

REGULAR MODEL — MODELE COURANT — MODELO CORRIENTE

Patented

"Regular" Model

Contains many features of the larger, more expensive units.

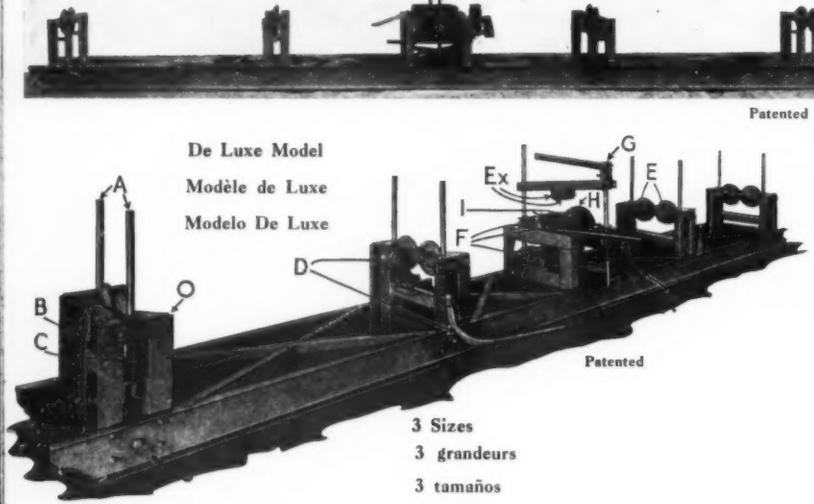
Model "corriente"

Il a bien des caractéristiques des groupes plus grands et plus chers.

Modelo "corriente"

Comprende muchos de los rasgos del modelo más grande y costoso.

De Luxe Model
Modèle de Luxe
Modelo De Luxe



Patented

De Lux Model

(Pipe Line Special)

The De Lux Model (made in 3 sizes), designed and built especially to meet the needs of gas, utility and pipe line companies. Specially constructed to handle pipe that is not quite straight.

Modèle de luxe

(Spécial pour pipe-lines)

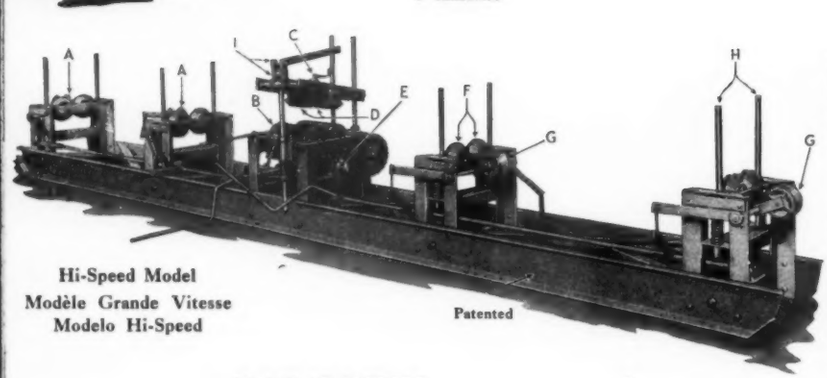
Le modèle de luxe (prévu en 3 tailles) est conçu et réalisé spécialement pour répondre aux besoins des compagnies de gaz, d'utilités et de pipe-lines. Prévu spécialement pour les conduites qui ne sont pas tout à fait droites.

Modelo De Luxe

(Especial para sistemas de tubería)

El modelo De Luxe, ofrecido en 3 tamaños, ha sido proyectado y construido especialmente para responder a las necesidades de compañías de gas, empresas de servicios públicos y sistemas de oleductos. Se adapta especialmente al manejo de tubos que no son perfectamente rectos.

3 Sizes
3 grandeurs
3 tamaños



Hi-Speed Model
Modèle Grande Vitesse
Modelo Hi-Speed

Patented

"Hi-Speed" Model

(The Complete Machine)

For big jobs involving miles and miles of pipe at high speed, where time, low cost per foot of cleaning, and minimum parts requirements are essential. This machine is the result of two years Engineering Research and Field Tests. Greater Speed—More Power—Greater Capacity—Heavier Construction Throughout—Complete With Power (Gas, Gasoline or Electric).

Modèle "Grande Vitesse"

(La machine complète)

Prévue pour les grands travaux comportant des kilomètres de tuyaux à nettoyer à grande vitesse, où le temps, le bas prix de revient du nettoyage unitaire, et un minimum de pièces sont essentiels. Cette machine est le fruit de deux ans de recherches techniques et d'essais de chantier. Plus grande vitesse—plus grande puissance—plus grande capacité—plus forte construction en tous points—au complet avec groupe-moteur (gaz, essence ou électrique).

Modelo "Hi-Speed"

(La máquina completa)

Para importantes trabajos de limpieza de miles y miles de kilómetros de tubería, que han de realizarse con suma rapidez, en el menor tiempo posible, a mínimo costo por metro y con mínimos gastos en repuestos y otros accesorios. Esta admirable máquina es el resultado de dos años de estudios técnicos y ensayos prácticos. Mayor velocidad, mayor fuerza, mayor capacidad y construcción general más firme y durable. Se suministra completa con motor de gas, de gasolina o eléctrico.

REGULAR MODELS

	HEAVY DUTY	STANDARD
Capacity	2" to 10¾" OD	¾" ID to 8⅝" OD
Weight	1865 lbs.	1765 lbs.
Power Required	10 HP Engine or 5 HP Motor	10 HP Engine or 5 HP Motor
Price	$825.00	$550.00
Crate	1300 lbs.	1300 lbs.
Export Weight	3165 lbs., 1438 kilos	3065 lbs., 1390 kilos
Crating	Extra	Extra

Power and pulleys extra

DE LUX MODELS

	MASTER	HEAVY DUTY	STANDARD
	2" to 14" OD	2" to 10¾" OD	¾" ID to 8⅝" OD
	2300 lbs.	2000 lbs.	1875 lbs.
	12 HP Engine or 5 HP Motor	10 HP Engine or 5 HP Motor	10 HP Engine or 5 HP Motor
	$825.00	$750.00	$675.00
	1300 lbs., 590 kilos	Same	Same
	3600 lbs., 1635 kilos	3300 lbs., 1500 kilos	3175 lbs., 1443 kilos
	Extra	Extra	Extra

Frame Drilled for dual unloaders

Power and pulleys extra

"HI-SPEED" MODEL

3" to 14" OD. Adapter for 2"
3400 lbs.
$1500.00
1300 lbs., 590 kilos
4700 lbs., 2135 kilos

Power and pulleys furnished

See Note Below.

Note—Hi-Speed Model—For Oceanic Export: Machine Crated Free.—For U. S., Canada, Northern Mexico: Instructor furnished to supervise installation and train crew, in lieu of crating machine.

All prices F. O. B. Tulsa, Oklahoma. Payable in U. S. Currency.

New Ideal

Duo-Hydraulic Pipe Straighteners and Pipe Bending Machines

KNOWN AROUND THE WORLD

RECLAIM BENT AND CROOKED PIPE

The New Ideal Duo-Hydraulic Pipe Straighteners and Bending Machines. Special design, super construction, speed, power and flexibility for reclaiming bent and crooked pipe, casing, rotary drill stems and Kellys, structural steel, rails, round and flat iron, etc. Five models of varying power, strength, capacity and speed.

ALL MACHINES EQUIPPED WITH:

Hydraulic Cylinders, of New Hydraulic Seamless Steel; Standard Size Leather Cup; Interchangeable Pipe Shoes; Enclosed Return Springs; Carrying Rollers; Steel Frames (no wood to rot); Our Own Pumps, built for long life. Each model has special features in addition. All models 12 ft. long; on steel frames mounted on steel sleds.

REGENERATION DE TUYAUX COURBES ET TORDUS

Les machines duo-hydrauliques New Ideal à redresser et à courber les tuyaux se distinguent par un tracé spécial, une construction supérieure, et un haut degré de vitesse, puissance et souplesse pour régénérer le matériel courbé ou tordu: tuyaux, revêtements, tiges de forage rotatif et Kellys, acier profilé, rails, fer rond et plat, etc. Cinq modèles de puissance, force, capacité et vitesses variées.

TOUTES LES MACHINES SONT EQUIPEES DE:

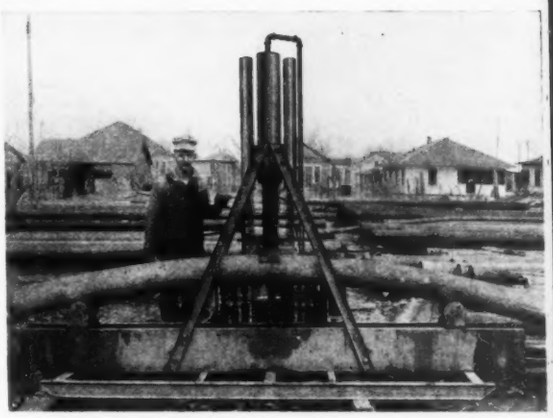
Cylindres hydrauliques en nouvel acier hydraulique sans soudure; cuvette de cuir de taille standard; sabots de tuyau interchangeables; ressorts de rappel enfermés; galets de transport; bâtis en acier (pas de bois pourrissable); nos propres pompes, construites pour durer. Chaque modèle a des caractéristiques spéciales en plus. Tous les modèles ont 12 pieds de long; sur bâtis en acier montés sur patins d'acier.

REHABILITA LOS TUBOS DOBLADOS O TORCIDOS

Las máquinas enderezadoras y dobladores de tubos New Ideal Duo-Hydraulic de especial proyecto y firme construcción, rápidas, poderosas y de amplia capacidad, sirven para rehabilitar tubos, revestimientos, vastagos de perforadores rotativos, kellys, acero de construcción, rieles, hierro plano y redondo y otras piezas dobladas o torcidas. Cinco modelos de diferentes características de fuerza, firmeza, capacidad y rapidez.

TODAS LAS MAQUINAS ESTAN EQUIPADAS CON

Cilindros hidráulicos de nuevo acero hidráulico sin costura; sostén de cuero de tamaño normal; zapatas de tubo intercambiables; resortes de retracción protegidos; rodillos de soporte; bastidores de acero, sin madera expuesta a pudrirse; bombas de nuestra propia construcción, de gran duración. Cada modelo tiene ventajas características, además de las comunes para todos. Todos los modelos tienen 12 pies de longitud. Van instalados en bastidores de acero soportados en patines de acero.



CROOKED JOINT OF PIPE. Five minutes later this was a straight joint of 32 lb. 8" casing.

JOINT DE TUYAU TORDU. Cinq minutes plus tard, on avait un joint redressé de revêtement de 8 pouces, 32 lbs.

JUNTA TORCIDA DE UN TUBO. Cinco minutos después, esta junta queda bien enderezada e instalada en un revestimiento de 8" de 32 libras.

SPECIAL MODELS BUILT FOR SPECIAL REQUIREMENTS—

MODELS "A", "B", AND "C"—(New Ideal) are adequate in size, capacity, speed, construction and ram pressure to meet all ordinary requirements. Handles pipe, structural steel, rails, round and flat iron, etc.

MODEL "A"—The Pipeliner's Friend—Manual operated, carrying wheels and shoes designed to fit the pipe. Ram stroke 18" maximum capacity 8⅝" OD.

MODEL "B"—Maximum capacity 8⅝" OD-29 lbs. Equipped with Hi-Speed Triplex pumps. Ram stroke 24". Power required: 5 H.P. electric or 6 H.P. engine.

MODEL "C"—The pumps are HI-PRESSURE Triplex pumps. 8⅝" OD, 32 or 36 lb. Maximum capacity. Power required: 5 H.P. electric or 6 H.P. engine.

MODEL "D"—BEN FRANKLIN SPECIAL—Most complete, compact and modern machine yet perfected. Normal maximum capacity 8⅝" OD. Ram stroke 24". Both Hi-Pressure and Hi-Speed Triplex pumps with 10 H.P. motor, give maximum 90,000 lbs. on the ram. Attachments for 10¾" OD—extra $55.00.

MODELES SPECIAUX POUR CAS SPECIAUX

MODELES "A", "B" et "C"—(New Ideal) de taille, capacité, vitesse, construction et pression de bélier amplement calculées pour répondre à toutes les conditions normales. Prévus pour tuyau, acier profilé, rails, fert rond et plat, etc.

MODELE "A"—L'ami de l'installeur de pipe-lines—à commande manuelle, roues de transport et sabots étudiés pour s'adapter au tuyau. Course du bélier 18 pouces, capacité maximum 8⅝ pouces de diamètre extérieur.

MODELE "B"—Capacité maximum 8⅝ pouces diamètre extérieur 29 lbs. Muni de pompes triplex de grande vitesse. Course du bélier 24 pouces. Puissance nécessaire: Electrique 5 CV ou moteur combustion interne 6 CV.

MODELE "C"—Les pompes sont des pompes triplex de HAUTE PRESSION. Diamètre extérieur 8⅝ pouces, capacité maximum de 32 ou 36 lbs. Puissance nécessaire: Electrique 5 CV ou moteur combustion interne 6 CV.

MODELE "D"—BEN FRANKLIN SPECIAL—La machine la plus complète, la plus compacte et la plus moderne à ce jour. Capacité maximum normale 8⅝ pouces de diamètre extérieur. Course de bélier 24 pouces. Pompes triplex de haute pression et de grande vitesse, avec moteur de 10 CV, donnant un maximum de 90.000 lbs. sur le bélier. Accessoires pour diamètre extérieur de 10¾ pouces—moyennant supplément de $55.00.

MODELOS ESPECIALES CONSTRUIDOS PARA REQUISITOS ESPECIALES

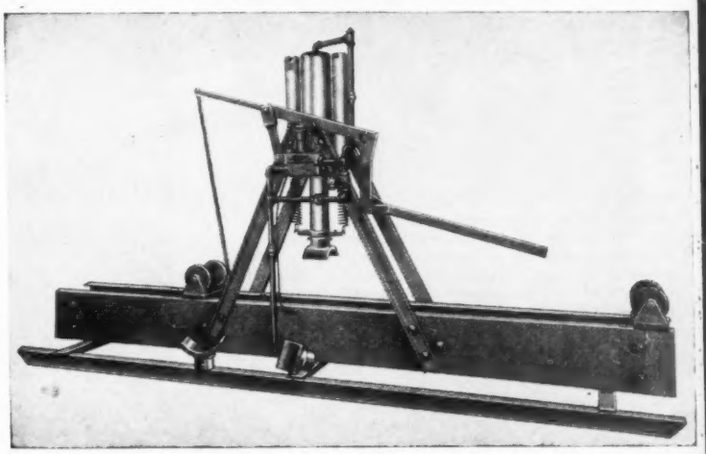
MODELOS "A", "B" y "C"—(New Ideal) son adecuados en tamaño, capacidad velocidad, construcción y presión re ariete, para satisfacer todos los requisitos ordinarios. Sirve para tubos, acero de construcción, rieles, hierro plano y redondo, etc.

MODELO "A"—"El Amigo del Instalador de Tubos"—De funcionamiento manual, provisto de ruedas y zapatas para admitir muy bien el tubo. Carrera del ariete, 18" como máximo, con cabida para tubo de 8⅝" de diámetro exterior.

MODELO "B"—Cabida o admisión máxima, 8⅝" de diámetro exterior y 29 libras. Equipado con grupo de triple bomba Hi-Speed. Carrera del ariete, 24". Fuerza requerida, 5 c. de f. con motor eléctrico, o 6 c. de f. con motor de combustiín interna.

MODELO "C"—Provisto de grupo de triple bomba HI-PRESSURE, con admisión para tubo de 8⅝" de diámetro exterior, de 32 o 36 libras, como capacidad máxima. Fuerza requerida, 5 c. de f. con motor eléctrico, o 6 c. de f. con motor de combustión interna.

MODELO "D"—BEN FRANKLIN ESPECIAL—La máquina más completa, compacta y moderna, de todas las de su clase, del mercado. Capacidad máxima normal, 8⅝" de diámetro exterior, con carrera de ariete de 24". Grupos de triple bomba Hi-Pressure y Hi-Speed. con motor de 10 c. de f. para asegurar una presión máxima de ariete de 90.000 libras. Aditamiento para admitir tubo de 10¾" de diámetro exterior al precio adicional de $55,00.



Model "A" Hand Operated

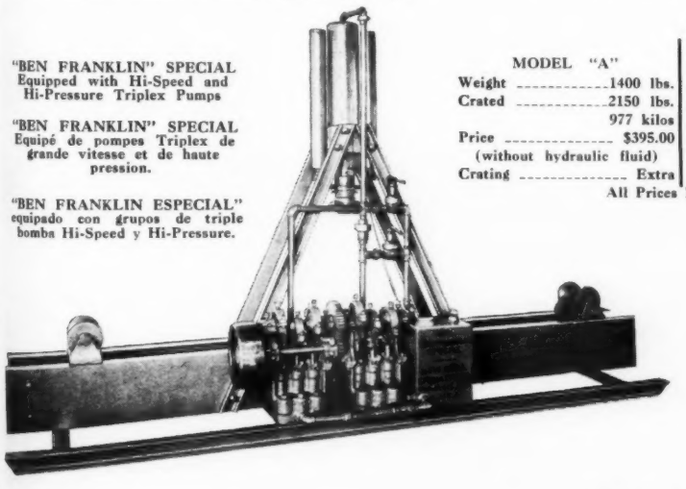
Modèle "A" à commande manuelle

Modelo "A" de funcionamiento manual

"BEN FRANKLIN" SPECIAL Equipped with Hi-Speed and Hi-Pressure Triplex Pumps

"BEN FRANKLIN" SPECIAL Equipé de pompes Triplex de grande vitesse et de haute pression.

"BEN FRANKLIN ESPECIAL" equipado con grupos de triple bomba Hi-Speed y Hi-Pressure.



SPECIFICATIONS

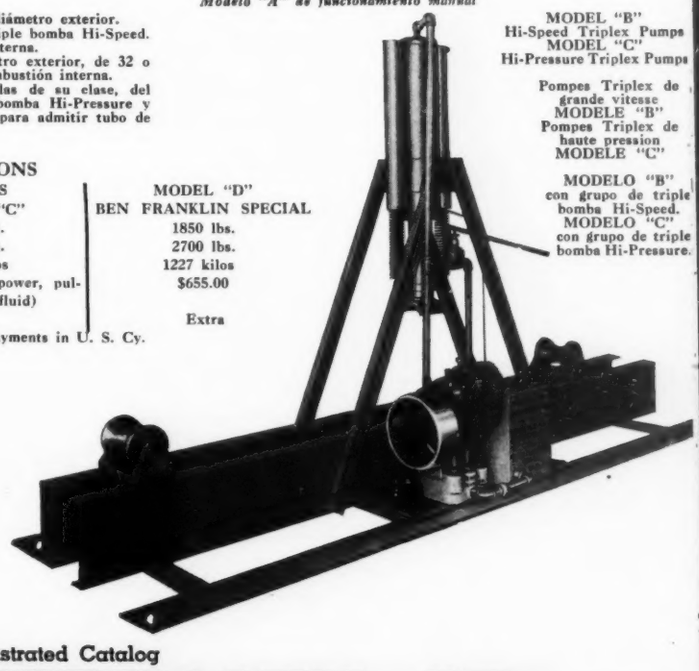
	MODEL "A"	MODELS "B" and "C"	MODEL "D" BEN FRANKLIN SPECIAL
Weight	1400 lbs.	1650 lbs.	1850 lbs.
Crated	2150 lbs.	2400 lbs.	2700 lbs.
	977 kilos	1090 kilos	1227 kilos
Price (without hydraulic fluid)	$395.00	$455.00 (without power, pulley or hydraulic fluid)	$655.00
Crating	Extra	Extra	Extra

All Prices F. O. B. Tulsa—Payments in U. S. Cy.

MODEL "B" Hi-Speed Triplex Pumps
MODEL "C" Hi-Pressure Triplex Pumps

Pompes Triplex de grande vitesse MODELE "B" Pompes Triplex de haute pression MODELE "C"

MODELO "B" con grupo de triple bomba Hi-Speed. MODELO "C" con grupo de triple bomba Hi-Pressure.



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The NEW DEAL SPECIALTY CO.

— INC. —

OKMULGEE, OKLA., U.S.A.

Export — Lucey Export Corporation

Our Catalog is listed in the COMPOSITE CATALOG

See New Deal section in 1937 COMPOSITE CATALOG.

3505 Woolworth Bldg., New York, N. Y.

Broad Street House, London, E.C. 2, England

"Au Plus la Pression est Forte - au Plus le Joint est Serré"

The Greater the Pressure - the Tighter the Seal"

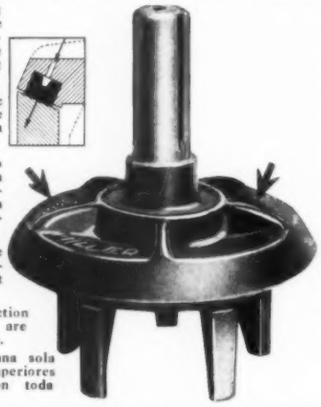
"Mientrás más Grande es la Presión - más se Cierra la Junta."

Les pistons et soupapes hydrauliques Miller sont étudiés en vue d'assurer un maximum d'efficacité, une économie certaine et un service durable et sans ennuis sous les pressions extrêmes et aux grandes vitesses de travail courantes dans le forage moderne.

PISTON HYDRAULIQUE MILLER DE SUPER-SERVICE

Le piston non-pulsatoire Miller utilise la pression de pompe pour dilater hydrauliquement une garniture de caoutchouc remplaçable et de grande durabilité qui n'a pas de parties minces ou de bords faibles susceptibles de se déchirer de l'âme. Le cliché à droite permet de se rendre compte comment de petits orifices à travers la tête de piston et prolongement permettent à la pression hydraulique de dilater le fourreau en caoutchouc, quel que soit le sens de la course. On emploie des fourreaux en caoutchouc extra-larges, qui se dilatent également sous pression et qui, en prenant contact avec une grande surface de la doublure de pompe, assurent un joint uniforme et positif. Ce joint serré empêche le sable, le gravier ou autres substances abrasives de venir se loger entre le piston et la paroi de la doublure—une des principales causes de dérivation et de panne prématurée dans le cas des types courants de pistons.

Les pistons hydrauliques Miller n'emploient dans leur fabrication que du matériel et de la main-d'oeuvre de choix. Ils sont en acier forgé, et usinés avec précision en vue d'un ajustage exact. Par leur emploi, on est sûr d'obtenir un rendement maximum et de réaliser des économies marquées sur les frais d'exploitation.



On voit ici comment la pression hydraulique dilate la pièce rapportée en caoutchouc pour former un joint positif.

Showing how hydraulic pressure expands the rubber insert for a positive seal.

Mostramos aquí como la presión hidráulica dilata la pieza de caucho insertada, para formar un cierre positivo.

La construction d'une seule pièce et les orifices supérieurs sont très visibles ici.

The one-piece construction and the top ports are clearly shown here.

La construcción de una sola pieza y los orificios superiores se presenta aquí con toda claridad.

SOUPAPE HYDRAULIQUE MILLER POUR POMPES A BOUES ET POMPES DE CONDUITES

A cause de sa grande efficacité et de son économie à l'usage, la soupape Miller a été adoptée comme équipement "standard" par un grand nombre des exploitants pétroliers d'élite du monde. Ici aussi, le joint s'effectue par pression hydraulique. La soupape, en acier d'une seule pièce, est munie d'une bague en caoutchouc encastrée dans la face conique. Il est prévu de petits orifices à travers le sommet de la soupape, ce qui permet à la pression d'être transmise intégralement à la rainure annulaire de la pièce rapportée en caoutchouc. Lorsque la soupape vient prendre contact avec le siège de soupape, la pression hydraulique s'exerce sur l'arrière de la pièce rapportée en caoutchouc; cette dernière se dilate contre la surface biseautée du siège, ce qui réalise un joint anti-fuite, positif. Quand, après un long service économique, la pièce rapportée en caoutchouc finit par s'user, on peut en faire le remplacement facile et rapide, et cela en ne dépensant qu'une fraction infime des débours qu'entrainerait le remplacement du groupe soupape complet.

Les sièges de soupape Miller sont forgés à la presse à partir d'acier au carbone de choix, cémenté et rectifié rigoureusement à la cote. Le degré juste de ténacité, dont dépendent la durabilité et l'efficacité maximum de pompage est réglé scrupuleusement d'un bout à l'autre de la fabrication. Le caoutchouc employé est d'une composition soigneusement étudiée et d'une résistance extrême à l'usure.

AUTRES PRODUITS MILLER DE RENOM

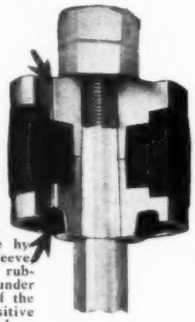
Pour le pompage à chaud des pétroles (dans les cas où la température ne dépasse pas 200 degrés F.), ainsi que pour la manutention à froid du pétrole ou d'eau contenant un produit chimique corrosif, les fourreaux à pétrole spéciaux Miller vous assureront un maximum de rendement et un minimum de frais d'exploitation. Nous fabriquons aussi des soupapes spéciales tout-laiton pour pompes d'alimentation de chaudières et pompes de conduites, ainsi que des soupapes multiples automatiques. Notices illustrées et prix sur demande.

PRODUITS MILLER A LA PORTEE DE TOUS

Si vous ne pouvez pas vous procurer les produits Miller auprès de votre source d'approvisionnement régulière, veuillez bien nous écrire à l'adresse ci-dessous; nous vous coterons nos plus bas prix et vous fournirons tout renseignement demandé.

Miller Hydraulic Pistons and Valves are designed to afford maximum efficiency, dependable economy and long, trouble-free service under the extreme pressures and high operating speeds encountered in present day drilling.

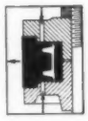
MILLER SUPER-SERVICE HYDRAULIC PISTON

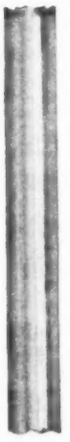


The non-pulsating Miller piston employs pump pressure to expand hydraulically a long-wearing, replaceable rubber packing which has no thin sections or weak edges to tear loose from the core. The illustration to right shows how small holes through both piston head and follower permit the hydraulic pressure to expand the rubber sleeve regardless of direction of stroke. Extra wide rubber sleeves are used, which expand evenly under pressure; and by contacting a large area of the pump liner they effect a uniform and positive seal. This close seal prevents sand, gravel or other abrasive substances from becoming lodged between the piston and the wall of the liner—one of the principal reasons for by-passing and early failure of ordinary types of pistons.

Only the finest quality materials and workmanship are used in Miller Hydraulic Pistons. They are of forged steel construction, and precision machined for accurate fit. They can be depended upon to deliver maximum service and effect substantial savings in operating costs.

MILLER HYDRAULIC VALVE FOR SLUSH PUMPS AND LINE PUMPS





Because of its high efficiency and operating economy, the Miller Valve has been adopted as "standard" equipment by many of the world's foremost oil operators. Here again, the seal is effected by hydraulic pressure. The valve is made from a single piece of steel, with a rubber ring recessed in the tapered face. Small ports lead through the top of the valve and allow the full pressure to be transmitted to the annular groove of the rubber insert. As the valve contacts the valve seat, hydraulic pressure is exerted back of the rubber insert; the rubber insert is expanded against the beveled surface of the seat and a positive, leak-proof seal is secured. When, after long, low-cost service, the rubber insert does become worn, it can easily and quickly be replaced at a fraction of the cost necessary to replace the complete valve assembly.

Miller Valve Seats are drop forged from finest carbon steel, case hardened and ground to an exact fit. The correct degree of hardness for long life and maximum pumping efficiency is rigidly controlled throughout the manufacturing process. The rubber used is carefully compounded and is extremely wear-resistant.

La pression hydraulique, qui s'exerce dans les deux sens, assure un joint égal et positif.

Hydraulic pressure from either direction insures an even, positive seal.

La presión hidràulica, que se ejerce en ambos sentidos, asegura una junta uniforme y positiva.

OTHER SUCCESSFUL MILLER PRODUCTS

For pumping hot oil (where the temperature does not exceed 200 degrees F.) also for handling cold oil or water having a corrosive chemical content, Miller Special Oil Sleeves will bring you increased efficiency and lower operating costs. We also manufacture Special All-Brass Valves for Boiler Feed Pumps and Line Pumps; and Automatic Manifold Valves. Write for illustrated bulletins and prices.

MILLER PRODUCTS EASILY SECURED

If you cannot obtain Miller Products through your regular source of supply, kindly address us as shown on this page, and we will quote you lowest prices, and supply any required information.

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MILLER

Hydraulic

VALVES & PISTONS

Los émbolos y las válvulas hidráulicas Miller se construyen especialmente para asegurar una eficacia máxima, una economía positiva y un servicio durable y sin molestia, bajo las presiones extremas y las grandes velocidades de trabajo que se presentan en la perforación moderna.

EMBOLO HIDRAULICO MILLER SUPER-SERVICE

El émbolo sin pulsación Miller utiliza la presión de bomba para dilatar hidráulicamente una empaquetadura de caucho reemplazable y de gran duración, la cual no tiene secciones delgadas ni bordes débiles susceptibles de separarse o soltarse del núcleo. La ilustración a la derecha permite darse cuenta de cómo los pequeños orificios a través de la cabeza del émbolo y la pieza siguiente hacen que la presión hidráulica dilate el manguito de caucho, sin relación de la dirección de la carrera. Se emplean manguitos de caucho bien grandes, que se dilatan uniformenete bajo la presión, y que al tener contacto con una gran superficie del forro de la bomba, aseguran un cierre uniforme y positivo. Esta junta bien cerrada impide que la arena, cascajo y otras substancias raspantes vengan a alojarse entre el émbolo y la pared del forro—una de las principales causas de la derivación y de la falla prematura, en el caso de los tipos corrientes de émbolos.

Los émbolos hidráulicos Miller se fabrican de los mejores materiales posibles y con un cuidado extremo. Se hacen de acero forjado y se labran a máquina, con gran precisión, para asegurarles un ajuste exacto. Gracias a su empleo, se puede contar con la seguridad de un rendimiento máximo y realizar notables economías en los gastos generales de explotación.

VALVULA HIDRAULICA MILLER PARA BOMBAS DE BARRO Y BOMBAS DE TUBERIA DE CONDUCCION

A causa de su gran eficacia y notable economía en funcionamiento, la válvula Miller ha sido adoptada como el equipo de norma por un gran número de importantes compañías petroleras del mundo. En este caso, la junta se efectúa también por la presión hidráulica. La válvula, de acero de una sola pieza, está provista de un anillo de caucho embutido en la cara cónica. Esta provista de pequeños orificios, a través de su parte superior, lo que permite que la presión pueda ser transmitida íntegramente a la ranura anular de la pieza de caucho insertada. Cuando la válvula tiene contacto con su asiento, la presión hidráulica se ejerce por detrás de la pieza de caucho insertada; esta última se dilata contra la superficie biselada del asiento, lo que establece una junta o unión hermética a todo escape, verdaderamente positiva. Cuando a continuación de un largo servicio económico, se desgasta la pieza de caucho insertada, debido al uso natural, ella puede entonces reemplazarse con facilidad y rapidez, a un costo que representa sólo una fracción del gasto que tendría que hacerse al renovar todo el grupo de válvula.

Los asientos de las válvulas Miller son de acero al carbono, forjado a martinete, cementado y esmerilado a tamaños exactos. El correcto grado de dureza, del cual depende la duración y la eficacia máxima del bombaje, se regula con sumo cuidado, en todas las fases de la fabricación. El caucho empleado es de una composición muy bien calculada, que ofrece una resistencia extraordinaria al desgaste.

OTROS FAMOSOS PRODUCTOS MILLER

Para el bombaje de petróleos calientes (en los casos en que la

Remarquez la rainure annulaire qui assure la répartition égale de la pression.

Note the annular groove which permits even distribution of pressure.

Obsérvese la ranura anular que asegura la repartición igual de la presión.

La méthode d'essayage Montron est employée pour vérifier la ténacité du siège de soupape forgé.

The Montron Test Method is used to control hardness of the forged Valve Seat

El método de ensayo Montron se emplea para verificar la dureza del asiento forjado de la válvula.

temperatura no pasa de 200 grafos F.) lo mismo que para el manejo de petróleo o de agua en estado frío, con algún contenido de producto químico corrosivo, los manguitos de petróleo especiales, de marca Miller, aseguran un rendimiento máximo y un mínimo gasto de explotación. Fabricamos también válvulas especiales, enteramente de latón, para bombas de alimentación de calderas y bombas de conductos, lo mismo que válvulas múltiples automáticas. Pídanos nuestros boletines ilustrados y precios.

LOS PRODUCTOS MILLER ESTAN AL ALCANCE DE TODOS

Si Ud. no puede obtener los productos Miller de su fuente corriente de abastecimiento, sírvase entonces escribirnos a la dirección de abajo, para tener entonces el gusto de suministrarle toda la información que nos pida y cotizarle los más bajos precios.

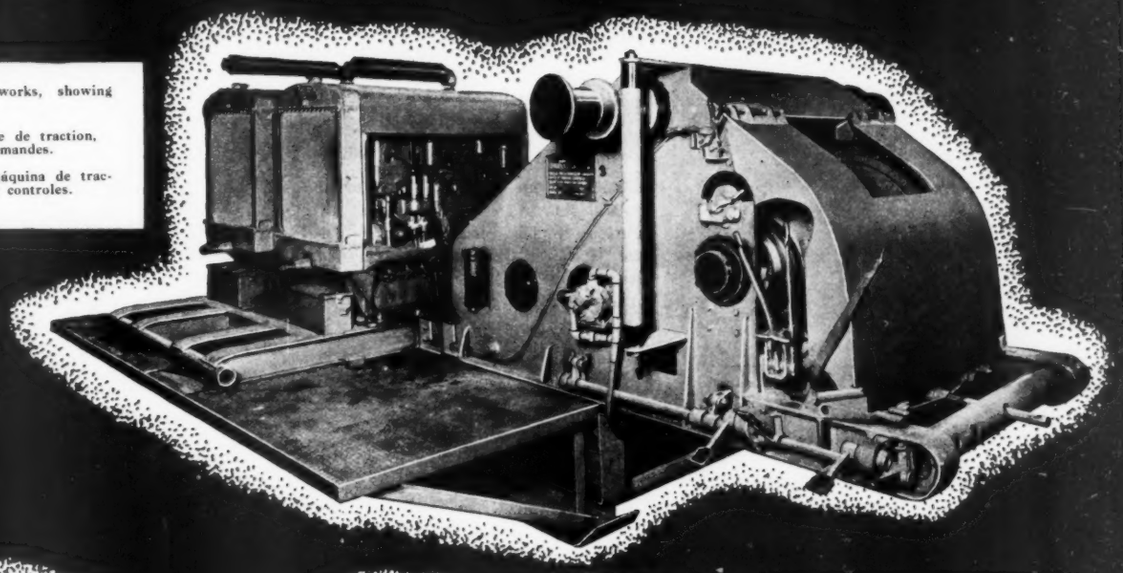
MODEL R-876 PORTABLE RIG

FOR 5,000-FOOT DRILLING

Front view of Draw works, showing controls.

Vue de face du groupe de traction, montrant les commandes.

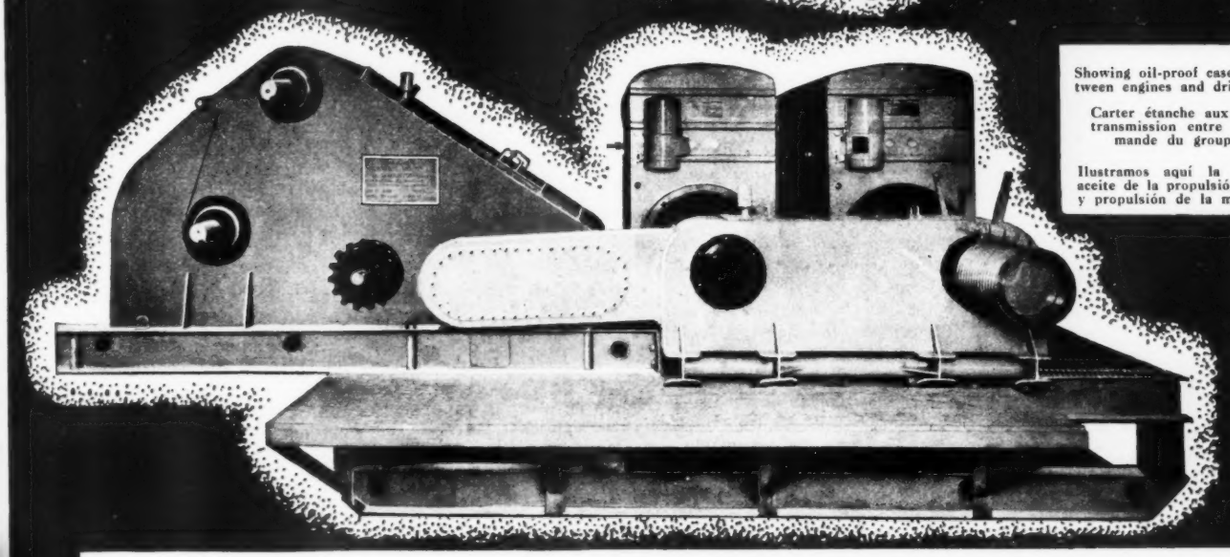
Vista delantera de la máquina de tracción, mostrando sus controles.



Showing oil-proof case housing drive between engines and drive to Draw works.

Carter étanche aux huiles contenant transmission entre moteurs et commande du groupe de traction.

Ilustramos aquí la caja hermética al aceite de la propulsión entre los motores y propulsión de la máquina de tracción.



Model R-876 includes totally enclosed draw works, two engines, compounding drives, and substructure. Pump provided force feeds lubrication to all chains, bearings, sprockets and shafts. Self-energizing brakes are watercooled by circulation in shoes attached to bands. Heavy duty friction clutches on drum and rotary shafts allow maximum power of engines to be utilized when most needed. Heavy duty herringbone gear transmission provides four forward and three reverse speeds. Dual engine drive (150 or 180 h.p. gasoline, natural gas, or Diesel fuel) permits power of both engines to be compounded into draw works or pumps. Air compressor included in the unit is used to engage and disengage engine clutches. Substructure, allowing either one or two pumps to be set on ground level, fits any height derrick, and provides walkway around entire unit.

Le modèle R-876 comprend un groupe de traction complètement enfermé, deux moteurs, des commandes composées et une sous-structure. La pompe assure le graissage sous pression de toutes les chaînes, paliers, pignons et arbres. Les freins auto-serreurs sont refroidis à l'eau par circulation dans des sabots fixés aux bandes. Des embrayages à frottement de service dur sur le tambour et les arbres du rotatif assurent une puissance maximum aux moteurs dont on peut tirer parti aux moments voulus. Une transmission de service dur à engrenages à chevrons comporte quatre vitesses avant et trois vitesses arrière. Double commande de moteur (150 ou 180 CV, essence, gaz naturel ou carburant Diesel), qui permet à l'énergie des deux moteurs de se jumeler dans le groupe de traction ou les pompes. Le compresseur à air prévu dans le groupe sert à mettre en prise ou hors de prise les embrayages du moteur. La sous-structure, qui permet à l'une ou l'autre des pompes ou aux deux d'être amenées au niveau du sol, s'adapte à toute hauteur de grue et comporte un trottoir surélevé tout autour du groupe.

El modelo R-876 comprende máquina de tracción completamente tapada, dos motores, propulsiones compuestas y subestructura. Bomba para proveer lubricación bajo presión a todas las cadenas, cojinetes, piñones y árboles. Los frenos de actuación automática tienen enfriamiento por agua circulada en las zapatas uindas a las cintas o bandas. Hay embragues de rozamiento, de servicio pesado, en los árboles de los tambores y de la rotativa, para concentrar la fuerza máxima de los motores en los momentos en que más se necesita. El cambio de marcha provisto de engranajes helicoidales dobles, de servicio pesado, suministra cuatro velocidades de avance y tres velocidades de retroceso. La propulsión de motor doble de 150 o 180 c. de f., de gasolina, gas natural o de tipo Diésel, permite aplicar la fuerza combinada de los dos motores a la máquina de tracción o a las bombas. El compresor de aire, incluido en el grupo, sirve para accionar el embrague y el desembrague de los motores. La subestructura, que permite la instalación de una o de dos bombas, al nivel del suelo, ajusta en el armazón de taladrar de cualquier altura y permite pasillo alrededor de la instalación completa.

PORTABLE RIG CO., INC.

EXPORT & FOREIGN OFFICE

HOUSTON, TEXAS

WRITE FOR NEW CATALOG

(Continued from Page 197)

enced drillers who claim it is necessary the shale be filled with gas before it will heave.

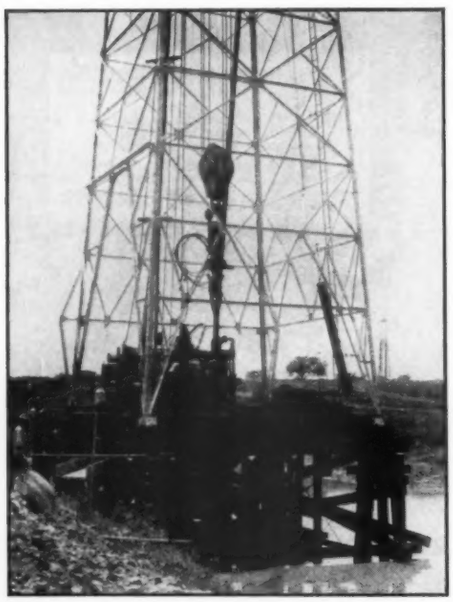
Another theory is that heaving shale is caused by high pressure oil in small reservoirs not connected with the general hydrostatic circulation. These shales seem to be associated always with areas moved by salt plugs where unusual forces have been set up and those forces are released when the drill penetrates the formations.

Sodium silicate and salt has been used successfully with mud and by maintaining pressures against the shale during drilling it has been found possible to penetrate it and set casing. A continuous circulating joint has been developed to offset troubles experienced when working continually in the same place such as milling on a casing shoe which often causes heaving shale troubles.

While no one method has been developed for overcoming heaving shale troubles in all wells much progress has been made in outlining general precautions when drilling in areas where this class of formation is known to exist.

CONTROL OF GAS WELLS

High pressure gas sands are common in the Gulf Coast fields. Many serious blowouts have occurred in attempting to drill through them. To bring the wells under control special methods have been employed, such as deflected holes, special



Setting surface casing

tools for fitting over the top of the casing or drill pipe, pumping mud into the wild well and snuffing out the fire by the use of chemicals or nitroglycerin. Every well has been eventually brought under control but all work of this kind has been costly.

The better method is to control gas pressures by using proper drilling mud, fitting the top of the casing with suitable control equipment and training the drillers to use proper precautions when drilling through high pressure formations.

Following these precautions one company has drilled more than 40 wells successfully in one Gulf Coast field, an outstanding record.

MOVING EQUIPMENT

Modern drilling equipment being very heavy, moving this has been costly and has necessitated systematizing of hauling and handling. This has

(Continued on Page 209)

(Continué de Page 197)

pons de sel où des forces exceptionnelles se sont accumulées et ce sont ces forces qui se trouvent subitement libérées lorsque le foret pénètre les formations.

On a employé avec succès le silicate de soude et le sel, avec des boues, et en maintenant de fortes pressions contre les schistes au cours du forage, on est parvenu à les pénétrer sans incident et à faire la pose du revêtement. En outre, on a perfectionné un joint de circulation continue afin d'avoir raison des ennuis si fréquents lorsqu'on travaille d'une manière continue à un même endroit, comme dans le cas du rodage d'un sabot de revêtement, ce qui entraînait généralement des soulèvements de schistes.

Bien qu'on n'ait pas encore mis au point une méthode unique pour se rendre maître des ennuis de soulèvements de schistes dans tous genres de puits, on a pourtant fait de réels progrès en indiquant les précautions générales à prendre lors du forage dans les régions où l'on sait que ce type de formation est présent.

CONTROLE DES PUITS A GAZ

Les sables à gaz de hautes pressions sont courants dans les champs pétrolifères du Golf du Mexique. De nombreux éclatements se sont produits lorsqu'on a essayé de forer dans ces gisements. Afin de se rendre maître de l'exploitation de ces puits, on est obligé d'avoir recours à des méthodes spéciales de contrôle, comme le forage de trous déviés, l'emploi d'outils spéciaux s'adaptant au-dessus de la partie supérieure du revêtement ou tuyau de forage, le pompage de boues dans le puits hors de contrôle et l'extraction du feu par l'emploi de produits chimiques ou de nitroglycérine. On a pu dans chaque cas, après plus ou moins de temps, se rendre maître d'un puits, mais de tels travaux reviennent toujours cher.

La meilleure méthode consiste à contrôler les pressions de gaz en faisant usage de boues de forage convenables, en équipant le haut du revêtement du matériel de contrôle approprié et en entraînant les ouvriers foreurs à prendre les précautions voulues lors du forage dans des formations à hautes pressions.

En prenant de telles précautions, une certaine compagnie a pu forer avec succès plus de 40 puits dans un chantier du Golf du Mexique, ce qui constitute un record remarquable.

MATERIEL DE TRANSPORT

L'équipement de forage moderne étant très pesant, le transport s'en est montré coûteux et a amené à rationnaliser les modes de transport et de manutention. On y est arrivé en projetant chaque déplacement à l'avance et en dressant des schémas du site de forage et en déterminant l'emplacement de chaque pièce d'équipement. En prévoyant à l'avance le chargement et le transport de chaque pièce d'équipement, on a réussi à transférer ce matériel d'un endroit à un autre en réduisant au minimum le nombre de chargements de camion et le nombre de voyages.

On emploie maintenant à cette fin des camions spéciaux avec des grues pesantes, qui chargent rapidement et efficacement par groupes plusieurs autres camions, transportant l'équipement au nouveau site, le déchargeant, et le déposant sur des fondations préparées à l'avance. Ce système non seulement économise temps et frais, mais encore économise sur le nombre de pièces nécessaires, car tout le tubage est standardisé. Un minim de garnitures est demandé, ce qui facilite le montage et le démontage de l'appareillage.

Il est maintenant d'un usage courant de monter la chèvre de forage sur des superstructures d'acier standardisées. Ces structures permettent aux con-

(Continué sur Page 209)

(Continué de Página 197)

ha perfeccionado una junta de circulación continua, para sobreponerse a los inconvenientes que se experimentan cuando se trabaja contínuamente en el mismo punto, como en el caso de repasar una zapata de revestimiento, cosa que por lo general causa desplazamientos de esquistos.

A pesar de que todavía no se ha perfeccionado un método seguro para evitar los desplazamientos o fallas de los esquistos, en toda clase de pozos, se ha alcanzado un gran progreso en la indicación de precauciones generales por tomarse durante la perforación de regiones donde se sabe que existe este tipo de formación.

CONTROL DE POZOS DE GAS

Las arenas de gas de alta presión son comunes en los campos de la Costa del Golfo de los Estados Unidos. Muchas serias explosiones han ocurrido se ha tratado de perforarlas. Para el seguro gobierno de los pozos se ham empleado métodos especiales, tales como agujeros desviados, herramientas especiales para adjustar en la cabeza del revestimiento o del tubo de perforación, inyección de barro en el pozo sin control y el apagamiento de incendio, mediante el uso de substancias químicas o nitroglycerina. Casi todo pozo ha sido así regulado, con el tiempo, pero todo trabajo de esta clase ha resultado costoso.

El mejor método es controlar las presiones del gas usando adecuado barro de perforación, equipo adecuado, instalado en la cabeza del revestimiento, para su mejor gobierno, y entrenamiento de los perforadores, para que toman las precauciones necesarias al perforar por formaciones de alta presión.

Tomando todas estas precauciones, una compañía ha perforado más de 40 pozos, con todo éxito, en el campo de la Costa del Golfo, lo que constituye un "record" sobresaliente.

TRASLADO DEL EQUIPO

Como el moderno equipo de perforación es muy pesado, su traslado resulta costoso, necesitando una cuidadosa sistematización del transporte y manejo en general. Esto se ha facilitado preparando cada movimiento de antemano, haciendo diagramas de los sitios de perforación y de los puntos para la instalación de cada parte del equipo. Mediante un plan arreglado de antemano, para la carga y el transporte de cada pieza del equipo, se ha podido transferir este material de un punto a otro en un número mínimos de cargas y viajes de camión.

Se emplean ahora camiones especiales, provistos de poderosas grúas. Mediante varias cargas coordinadas, los camiones transportan el equipo al nuevo punto, lo descargan y lo colocan en sus respectivos puntos de instalación, los cuales han sido preparados de antemano. Este sistema coordinado no sólo reduce tiempo y gastos, sino que ahorra también en abastecimientos de instalación, pues aprovecha casi todas las conexiones y accesorios empleados en tuberías, las cuales son de tamaños normalizados. La instalación, en realidad un número mínimo de conexiones, lo que acelera su montaje y desmontaje.

Es ahora corriente la práctica de levantar la torre o armazón de taladrar o perforar sobre soportes de acero de formas y tamaños normalizados. Estos soportes permiten a los constructores de los cimientos preparar de antemano la instalación, para la colocación del equipo de perforación, lo que ahorra tiempo y facilita todo el trabajo.

Estos métodos son muy importantes, pues tienden a ahorrar gastos, particularmente al tratarse de perforar numerosos pozos especulativos, muchos de los cuales resultan agotados.

(Continué en Página 209)

A Dependable Source of Supply for Pumps and Pulling Equipment

If you are operating pumping wells you should have a catalog of O'Bannon pumping equipment.

The new O'Bannon catalog illustrates and describes a pump for each type and size of well—pumps which have gained a reputation for low cost and dependable operation during our 16 years' service to the oil industry.

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This little magazine of news, humor and information has been enjoyed by oil men now for more than 10 years. We will gladly send it regularly to those who operate pumping wells, *without charge*. Just mark the space in the coupon if you would like to receive it.

Pompes et matériel de traction de qualité

Si vous exploitez des puits pétroliers par pompage, il est de votre intérêt d'avoir un catalogue du matériel de pompage O'Bannon.

Le nouveau catalogue illustré O'Bannon prévoit une pompe pour chaque type et pour chaque grandeur de puits — pompes qui se sont acquis une réputation de fonctionnement économique et de qualité au cours de 16 ans de service dans l'industrie du pétrole.

D'un intérêt égal pour vous est notre documentation sur le matériel de traction, comme des crampons de tiges aspiratrices, des élévateurs et des douilles, des crampons de tubage, des croisillons, et un grand nombre d'autres articles similaires.

Pour recevoir ce catalogue et notre documentation complète de pompage, remplir le coupon et nous le renvoyer.

Ecrivez-nous dans votre langue.

Bombas y material de tracción dignos de confianza

Si Ud. está explotando pozos petrolíferos mediante equipos de bombaje, le conviene entonces tener un catálogo del material de bombaje O'Bannon.

El nuevo catálogo ilustrado de la O'Bannon describe e ilustra un bomba para cada tipo y tamaño de pozo—bombas que se han hecho famosas por su funcionamiento económico y digno de completa confianza, desde hace más de 16 años, al servicio de la industria petrolífera mundial.

De igual interes para Ud. será nuestra información sobre material de tracción, que comprende ganchos de vástagos de aspiración, elevadores y receptáculos, ganchos de tubería, crucetas o arañas y muchos otros accesorios similares.

Para recibir este catálogo repleto de información sobre equipos de bombas, sírvase llenar el cupón de abajo y devolverlo a nuestra dirección.

Escríbanos en su idioma.

O'Bannon Sucker Rod Elevators fit all makes and sizes of rods.

Les élévateurs de tiges aspiratrices O'Bannon s'adaptent à toutes les marques et tailles de tiges.

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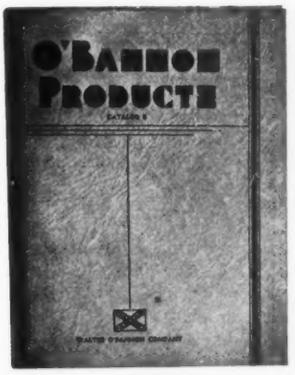
O'Bannon Sucker Rod and Tubing Hooks are exceptionally easy and safe to operate.

La tige aspiratrice et les crampons de tubage O'Bannon sont d'un maniement des plus faciles et des plus sûrs.

El vástagos de aspiración y los ganchos de tubería O'Bannon se prestan a un manejo sumamente fácil y seguro.



MARK THE COUPON and we will send you this helpful catalog of pumping equipment information.

REMPLISSEZ LE COUPON et nous vous ferons parvenir ce précieux catalogue documenté en matériel de pompage.

LLENE Y DEVUELVANOS EL CUPON para enviarle este interesante catálogo relativo a información práctica sobre equipo de bombas.

WALTER O'BANNON COMPANY

TULSA, OKLAHOMA

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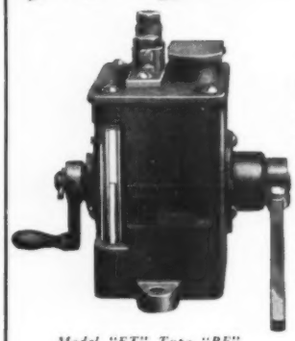


Model "ET" Type "BE"

FORCE FEED LUBRICATORS

Made in single or multiple feed types to dependably feed oil to all classes of equipment. Few parts, sturdily built, easily accessible; single plunger pumping principle with ball valves and sight feed devices showing oil on its way to delivery point are reasons why Hills-McCanna Lubricators are the most positive method of lubrication. Power drives for every requirement.

GRAISSEURS SOUS PRESSION

Modèles divers: à débit simple ou multiple pour assurer la lubrification efficace en huile de tout genre de matériel. Un minimum de pièces, de construction robuste, facilement accessibles; mécanisme de pompage à plongeur unique avec soupapes à bille et dispositifs à débit visible permettant de suivre l'huile sur tout son parcours, autant de raisons qui font que les graisseurs Hills-McCanna offrent le mode de lubrification le plus positif. Commandes mécaniques pour tous les cas.

LUBRICADORES DE PRESION

Se ofrecen en tipos de alimentación sencilla o multiple, para asegurar la lubricación eficaz de todo tipo de equipo. Un número mínimo de piezas, una firme y durable construcción, notable accesibilidad, un mecanismo de bomba de un solo émbolo, con válvulas esféricas y dispositivos de alimentación visible, que permiten seguir el curso del lubricante a su destino, son las razones principales que hacen que los lubricadores Hills-McCanna representen el método de lubricación más positivo. Propulsión mecánica para todo requisito.

THERMOMETER WELLS AND STILL PLUGS

We have installed special equipment that enables us to produce thermometer wells, pyrometer protection tubes and still plugs accurately and economically. These parts can be made from any machineable alloy. They are commonly made of aluminum-bronze, nickel-bronze and stainless steel. Stocks of the more popular sizes are carried. Special types can be produced on short notice.

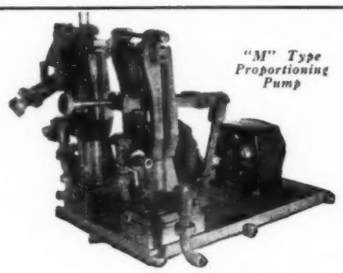
Thermometer Wells—Pyrometer Protection Tubes and Still Plugs.

PUITS DE THERMOMETRE ET BOUCHONS D'ALAMBIC

Nous avons fait l'installation de matériel spécial qui nous permet de produire des puits de thermomètre, des tubes de protection de pyromètres et des bouchons d'alambic, avec toute la précision et l'économie désirables. Ces pièces peuvent être fabriquées à partir de tout alliage usinable. Elles sont en général faites en bronze d'aluminum, en bronze au nickel et en acier inoxydable. Nous en tenons des stocks pour les tailles les plus courantes. Des types spéciaux peuvent être produits sur court préavis.

POZOS DE TERMOMETRO Y TAPONES DE ALAMBIQUE

Hemos hecho la instalación de material especial, que nos permite producir pozos de termómetro, tubos de protección de pirómetros y tapones de alambique, con toda la precisión y la economía necesarias. Estas piezas pueden fabricarse de cualquier aleación susceptible de labrarse a máquina. Se hacen generalmente de bronce de aluminio, de bronce al níquel o de acero inoxidable. Tenemos en existencia los tamaños más populares. Los tamaños especiales pueden hacerse en corto tiempo.



"M" Type Proportioning Pump

CHEMICAL PROPORTIONING PUMPS

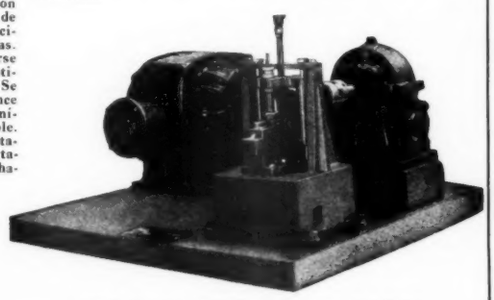
We manufacture chemical proportioning pumps in four types and over 200 sizes to meet field, laboratory or refinery requirements. Built on the single plunger principle which ensures absolute accuracy and dependability. Power drives to suit local conditions. Special catalog on request.

POMPES DE DOSAGE CHIMIQUE

Nous fabriquons des pompes de dosage chimique de quatre types, et cela en plus de 200 grandeurs, pour les besoins du chantier, du laboratoire et de la raffinerie. Application du principe à plongeur unique, d'où précision absolue et régularité impeccable. Commandes mécaniques adaptées aux conditions locales. Catalogue spécial sur demande.

BOMBAS DE DOSIFICACION QUIMICA

Fabricamos bombas de dosificación química de cuatro tipos, en más de 200 tamaños diferentes, para satisfacer las necesidades de cualquier yacimiento, laboratorio y refinería. Se fabrican sobre el principio de un solo émbolo, el cual asegura absoluta precisión y regularidad. Catálogo especial a solicitud.



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GLANDLESS LUBRICATED PLUG VALVES

Pressures to 3000 lbs. per sq. in.
Round parts (full bore of pipe)
Abrasion Resisting
Made in cast steel and various special metals
Eminently suited for Christmas Trees, Mudhens, etc.

Pressions jusqu'à 3000 lbs. par pouce carré.
Pièces rondes (alésage intégral du tuyau)
Résistant à l'abrasion
En acier coulé et divers alliages spéciaux
Tout indiqués pour Arbres de Noël, Mudhens, etc.

Presiones hasta 3000 libras por pulgada cuadrada.
Piezas redondas (al diámetro completo del tubo).
Gran resistencia al desgaste.
De acero fundido y de varias aleaciones especiales.
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Write for fully illustrated and descriptive catalogue.

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Sírvase pedirnos catálogo descriptivo e ilustrado de todos estos productos.

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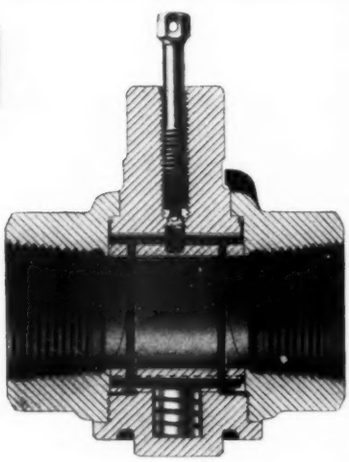

No glands, packing or gaskets
Visual external indication of full lubrication
Parallel (cylindrical) plug always in contact with seat

Ni brides, ni garniture, ni joints
Indication externe visuelle de tout le graissage
Bouchon parallèle (cylindrique) toujours en contact avec le siège

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No hay casquillos, ni empaquetadura ni uniones.
Indicación externa visual de toda la lubricación.
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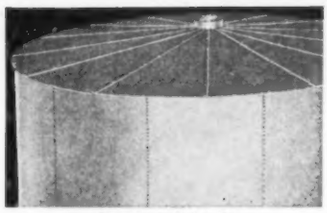
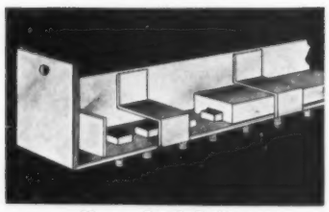


Segmental Decks
Puentes segmentarios
Ponts segmentaires



Heavy Steel Rafters
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Poutrelles de fort acier

Improved Packing
Empaque mejorado
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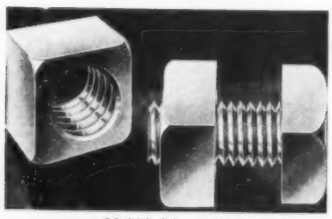
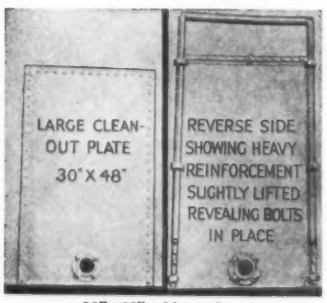
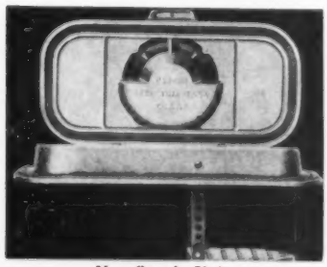


90,000-Lb. Bolts
Pernos de 90.000 lbs.
Boulons type 90.000 lbs.

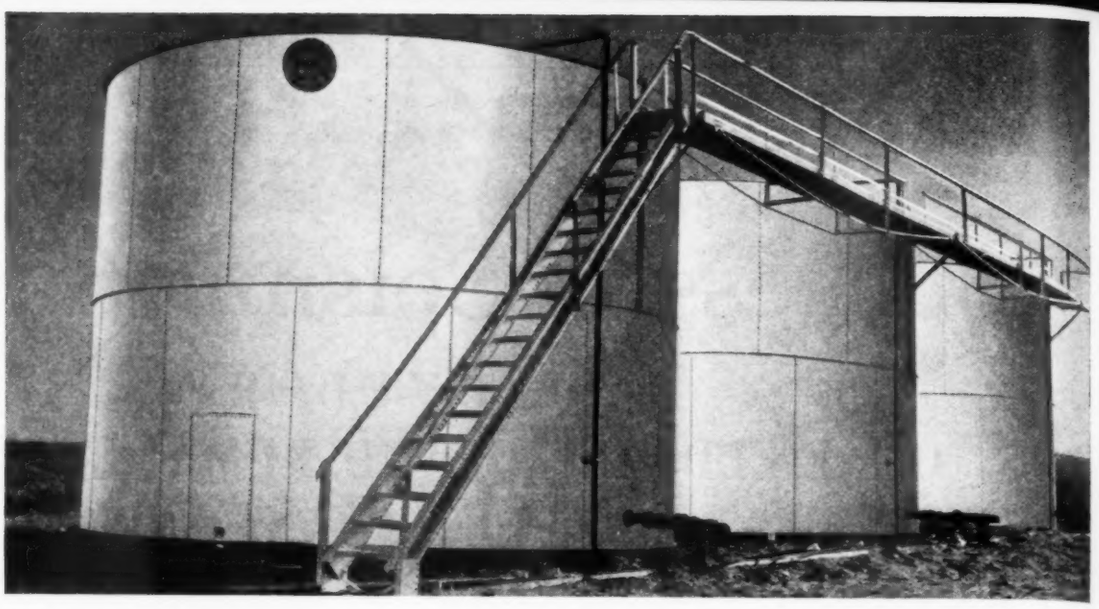


30"x48" Clean-Out
Placa de limpieza de 30" x 48"
Plaque de nettoyage 30 x 48 pouces



Non-Spark Valve
Válvula de seguridad
Soupape "non-étincelle"

38 on Walkway
38 en el pasillo
38 sur le passage



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MALONEY pioneered the bolted steel tank, in 1912, and has specialized ever since in the manufacture and improvement of this type of tank and its accessories. Today, MALONEY Tanks, Walkways and accessories approach perfection in every detail, offering a number of exclusive advantages.

Among the advantages of MALONEY Tanks are construction of Keystone Copper Steel; patented "crimp" at all seams and joints insuring accurate fit of parts; heavy steel deck rafter; durable cloth-inserted red rubber packing; special bolts of 90,000 lbs. tensile strength; large 30" x 48" clean-out plate; aluminum non-spark vacuum-pressure valve with shelf for thief inside.

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The MALONEY self-supporting, sectional steel Stairway and Walkway we offer as the strongest, simplest, most easily erected product in its field. Standard 4, 6 and 8-foot units render it possible to construct any combination of stairways and walkways that may be required. Tread units are welded at corners, and cross supports are welded beneath tread every 2 feet. Strictly non-sagging. Improved non-skid tread.

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MALONEY Tanks and Walkways may be ordered with heavy, "hot-dip" galvanized coating, if desired. Standard MALONEY Tanks are galvanized with pure zinc by the superior "double hot-dip" process, AFTER FABRICATION, insuring that all edges, including bolt holes, are galvanized. Our 90,000-lb. bolts are also "hot-dip" galvanized. This coating affords maximum protection against corrosion.

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Tank capacities 100 to 10,000 bbls. Export shipments are sturdily packed in steel-bound crates conforming to customs regulations of countries to which shipped. Export Offices: Lucey Export Corp., 3505 Woolworth Bldg., New York; Rose Lloyd & Co., Ltd., London.

EL PRIMER TANQUE EMPERNADO

La MALONEY fué una de las primeras en construir tanques de acero empernados, en 1912 y desde entonces se ha dedicado con especialidad a la fabricación y refinamiento de este tipo de tanque y sus accesorios. Hoy día, los tanques, los pasillos, las escaleras y otros accesorios de marca MALONEY son los más perfectos en todo detalle, ofreciendo numerosas ventajas exclusivas.

Entre las ventajas de los tanques MALONEY se incluyen su construcción de acero cúprico Keystone; "ondulación" patentada en todas las costuras y uniones para asegurar ajuste exacto a las piezas; sostén de cubierta de acero grueso; durable empaquetadura de caucho rojo insertada en tela; pernos especiales con resistencia de tensión de 90.000 libras; placa grande de limpieza de 30" x 48"; válvula de presión al vacío "sin chispa" con anaquel interior para dispositivo indicador.

Nuestra pintura roja de óxido de hierro cromado, de gran resistencia a la corrosión, se usa en el interior y como capa de imprimación en el exterior. La capa de acabado para el exterior es fina pintura de aluminio.

Escaleras y pasillos

La escalera y pasillo MALONEY de soporte propio, de construcción seccional de acero, representan lo más firme, sencillo y fácil de instalar de su clase en el mercado. Mediante secciones normales de 4, de 6 y de 8 pies es posible formar cualquiera combinación de escaleras y pasillos que se quiera. Los escalones o peldaños están solados en las esquinas y los soportes transversales están soldados cada dos pies debajo del escalón. Es una construcción segura que no puede ceder o deformarse. Escalones antideslizantes de tipo perfeccionado.

Galvanizado, si se quiere

Los tanques y los pasillos MALONEY pueden también pedirse con gruesa capa galvanizada en caliente. Los tanques normales MALONEY se galvanizan con puro zinc por el excelente procedimiento de "doble inmersión" al calor, DESPUES DE LA FABRICACION, lo que asegura completa galvanización de todos los bordes y agujeros de pernos. Nuestros pernos especiales con resistencia de tensión de 90.000 libras se galvanizan también en baño caliente. Esta galvanización les imparte protección máxima contra el enmohecimiento o corrosión.

Servicio de exportación

Tanques en capacidades de 100 a 10.000 barriles. Los embarques de exportación se empacan muy bien en firmes huacales reforzados por bandas de acero o precintas, de acuerdo con las regulaciones aduanales de los países a que vayan consignados. Oficinas de exportación: Lucey Export Corp., 3505 Woolworth Bldg., Nueva York, N. Y., E. U. A.; Rose Lloyd & Co., Ltd., Londres, Inglaterra.

LE PIONNIER DES RESERVOIRS BOULONNÉS

MALONEY a été un pionnier dans la construction du réservoir boulonné en acier, dès 1912, et s'est spécialisé depuis lors dans la fabrication et le perfectionnement de ce type de réservoir et de ses accessoires. A l'heure actuelle, les Réservoirs, Passages et accessoires MALONEY approchent de la perfection dans le moindre détail, offrant un bon nombre d'avantages exclusifs à la marque.

Parmi les avantages des réservoirs MALONEY, on peut citer: sa construction d'acier cuprifère Keystone; la "sertissement" breveté à tous les joints et soudures, pour ajustage impeccable des pièces; poutrelle de pont en acier de fort calibre; garniture durable en caoutchouc rouge avec intercalation de toile; boulons spéciaux d'une résistance à la traction de 90.000 lbs.; grande plaque pour le nettoyage mesurant 30 pouces sur 48 pouces; soupape l'aluminium non-étincelle à pression de vide avec à l'intérieur un rayon pour dispositif carottier.

Notre peinture rouge chromatée à base d'oxyde de fer, d'une grande résistance à la corrosion, est employée sur les surfaces intérieures, et comme couche de base sur les surfaces extérieures. La couche de fini appliquée sur les surfaces extérieures est une qualité supérieure de peinture à l'aluminium.

Escaliers et Passages

Nous offrons l'escalier et passage MALONEY en acier, sectionnel et se tenant seul, comme étant la structure la plus robuste, la plus simple et la plus facile à installer qui soit offerte dans la branche. Des unités standards de 4, 6 et 8 pieds permettent de construire toute combinaison imaginable d'escaliers et de passages selon les besoins particuliers de l'usager. Des plaques protectrices sont soudées aux coins, et des supports transversaux sont fixés par soudage en-dessous de la plaque protectrice tous les 2 pieds. Rigoureusement non susceptible de s'affaisser. Plaque de protection anti-dérapante perfectionnée.

Galvanisé, si on le désire

Si on le désire, on peut obtenir les réservoirs et passages MALONEY recouverts d'une forte couche galvanisée, obtenue par "trempage à chaud." Les réservoirs standards MALONEY sont galvanisés au zinc pur au moyen du procédé supérieur du 'double trempage à chaud," APRES FABRICATION, ce qui assure que tous les bords, y compris les trous de boulons, sont bien galvanisés. Nos boulons de résistance 90.000 lbs. sont aussi galvanisés par trempage à chaud." Ce trempage assure une protection maximum contre la corrosion.

Service d'exportation

Capacités de réservoir allant de 100 à 10.000 barils. Les expéditions d'exportation sont faites dans un emballage solide, en caisses à claire-voie cerclés de fer, se conformant aux exigences douanières des pays de destination. Bureaux d'exportation: Lucey Export Corp., 3505 Woolworth Bldg., New-York; Rose Lloyd & Co., Ltd., London.

MALONEY TANK MFG. COMPANY . . . TULSA, OKLA., U. S. A.

MALONEY

(Continued from Page 204)

been done by planning every move in advance and making diagrams of the drilling site and spotting location of each piece of equipment. By a prearranged plan of loading and hauling each piece of equipment it has been possible to transfer this material from location to location in the minimum number of truck loads and trips.

Special trucks with heavy cranes are now used and by cooperation load several trucks quickly and transport the equipment to the new site, unload it and place it upon previously prepared foundations. This system not only reduces time and cost but saves in number of parts required as all piping is standardized. A minimum number of fittings is required which facilitates rigging up and knocking down.

It is now common practice to erect the drilling derrick upon standardized steel superstructures.

Portable drilling machine

These structures allow rig builders to prepare foundations in advance of running the derrick and cut the work necessary to rig up to a minimum.

These are all important items in cost where numerous wildcats are being drilled, many of them dry and any saving is important.

FISHING

Fishing, in connection with rotary drilling, is experiencing a rapid decline in relation to the number of feet drilled. Twist-offs have caused most fishing jobs in rotary tests; and twist-offs are generally caused by crooked holes. Since producers have practically all reached the point where they demand straight holes, fishing in rotary wells has sharply decreased. The necessity of reducing weight on the bit for straight drilling has also played its part in cutting down fishing operations. However, with the rapid advancement in drilling equipment design, some credit must be given to the manufacturers.

Fishing jobs are encountered in cable-tool drilling very frequently in spite of improved equipment and improved steel used in drilling lines. This is because need for greater oil supply in the eastern United States, where cable tools are used almost exclusively, has resulted in deeper drilling in this area. The fact that many cable-tool tests reach a depth of 6,000 or 7,000 feet without a fishing job tends to defeat the argument that the standard rig is unsuitable for deep drilling.

Most recent improvements on fishing methods

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structeurs d'appareillage de préparer les fondations avant de mettre la chèvre en service et ainsi de réduire au minimum le travail nécessaire à l'appareillage.

Ce sont là tous des éléments importants dans l'addition des frais d'exploitation, surtout quand on considère le grand nombre de forages infructueux, souvent sans pétrole au bout, de sorte qu'on ne peut pas dédaigner aucun facteur d'économie.

PECHAGE

Le pêchage, en relation avec le forage rotatif est en train d'enregistrer un déclin rapide par rapport au nombre de pieds de forage. Ce sont les faussages pendant le forage qui entraînent en général des opérations de pêchage au cours des essais de rotatif, et l'on sait que ces faussages sont généralement causés par des trous tordus. Or, comme les producteurs sont pour la plupart arrivés au point où ils exigent le forage de trous rectilignes, le repêchage dans les puits rotatifs est nettement plus rare. La nécessité de réduire le poids appliqué sur le trépan a aussi joué son rôle dans la réduction des opérations de pêchage. Toutefois, les progrès rapides réalisés dans la construction du matériel de forage ont aussi beaucoup aidé, ce qu'il faut reconnaître aux fabricants de cet équipement.

On doit encore fréquemment avoir recours à des opérations de pêchage en forage avec outil sur câble, et cela malgré du matériel perfectionné et l'emploi d'acier meilleur pour les câbles de forage. Ceci résulte du fait de la grande demande en pétrole dans l'Est des Etats-Unis, où l'on emploi presque exclusivement les outils à câble, ce qui a obligé à faire des forages plus profonds dans ces régions. Le fait que de nombreux essais de forage avec outil à câble atteignent une profondeur de 6000 ou 7000 pieds sans une seule opération de pêchage, tend à réfuter l'argument que l'appareillage standard n'est pas adapté au forage en profondeur.

Les plus récents perfectionnements réalisés dans les méthodes de pêchage sont nés de la nécessité de libérer les outils perdus avant qu'on ne puisse les extraire. On a amélioré les procédés par "lavage" dans le repêchage. Toutefois, le matériel et la pratique du pêchage restent essentiellement les mêmes, les efforts récents ayant plutôt visé à supprimer le repêchage, au lieu de chercher à améliorer les procédés. Chaque cas de repêchage est un problème individuel, et le matériel nécessaire pour un cas donné peut différer du matériel demandé pour d'autres cas. On fait souvent usage d'acide pour essayer de dégager les outils qui se coincent dans les parois calcaires.

POMPAGE DES PUITS PROFONDS

Les puits de plus de 5.000 pieds de profondeur ont soulevé de nombreux problèmes dans la production. On a eu recours à six méthodes environ dans le chantier d'Oklahoma City, à savoir: écoulement naturel, élévateur de gaz et divers dispositifs élévateurs de gaz, pompes centrifuges électriques du type submergé, cylindres pneumatiques de pompage, groupes de pompage individuels et à levier culbuteur, et enfin des pompes hydrauliques submergées.

Lorsque l'écoulement naturel des puits vient à cesser, la pratique couramment adoptée consiste à y installer un équipement élévateur de gaz. Un nouveau ralentissement de la production a amené à installer quelque autre type d'équipement, et un bon nombre de puits ont été ainsi pourvus de groupes de pompage à culbuteur ou individuels. Des groupes simples et jumelés à plateaux-volants à bandage sont utilisés et actionnés soit par des

(Continué sur Page 214)

PESCA

La pesca, en relación con la perforación rotativa, está experimentando un rápido decaimiento, en comparación con el número de piez perforados. Las torsiones, durante la perforación, constituyen la causa principal del empleo de herramientas de pescar, y se sabe que estas torsiones son generalmente provocadas por agujeros ladeados o torcidos. Como casi todos los productores han llegado al punto en que exigen la perforación de agujeros rectilíneos, la operación de pescar, en los pozos rotativos, ha decaido sensiblemente. La necesidad de reducir la fuerza aplicada a la barrena ha tenido también influencia en reducir las operaciones de pesca. Por otra parte, los rápidos progresos alcanzados en la construcción de material de perforación, bajo la iniciativa de los mismo fabricantes de esta clase de equipo, también han tenido influencia en este sentido.

Sin embargo, se repiten con frecuencia las operaciones de pesca en conexión con la perforación mediante herramienta de cable, a pesar del material perfeccionado y del mejor acero que se emplea en la construcción de los cables de perforación. Esto se debe a la gran demanda de petróleo en la región del este de los Estados Unidos, donde se emplean casi exclusivamente herramientas de cable, lo que obliga a hacer perforaciones más profundas en esta región. El hecho de que muchos ensayos con herramienta de cable llegan a una profundidad de 6000 o 7000 pies, sin una sola operación de pesca, tiende a refutar el argumento de que el aparejo normal o standard no es adaptado a la perforación a gran profundidad.

Los más recientes perfeccionamientos en los métodos de pesca han nacido de la necesidad de soltar los útiles perdidos antes de que no puedan extraerse. Los métodos de lavado se han perfeccionado. Sin embargo, el material y la práctica de pesca continuan esencialmente sin cambios, pues los recientes esfuerzos se han encaminado más bien a evitar en lo posible la operación de pesca, que a perfeccionar los mismos métodos o procedimientos de pesca. Cada caso de pesca es un problema individual, y el material necesario para un caso dado, puede ser muy distinto del material exigido para otros casos. A menudo se hace uso de ácido para tratar de soltar las herramientas que se clavan o atascan en las paredes calcáreas.

BOMBAJE DE POZOS PROFUNDOS

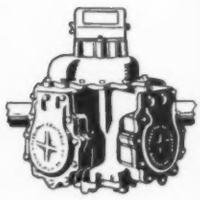
Los pozos de más de 5.000 pies de profundidad han presentado numerosos problemas en la producción. Se ha recurrido al empleo de seis métodos en los yacimientos de Oklahoma City, E.U.A., que han sido los siguientes: flujo natural, elevador de gas y varios dispositivos elevadores de gas, bombas centrífugas eléctricas del tipo sumergido, cilindros neumáticos de bombaje, grupos de bombaje individuales y de tipo de balancín, y finalmente, bombas hidraúlicas sumergidas.

Cuando cesa el flujo natural de los pozos, la práctica corrientemente adoptada consiste en instalar un equipo elevador de gas. El adicional d e c a i m i e n t o en producción ha impuesto la necesidad de instalar algún otro nuevo tipo de equipo, y por esta razón, un buen número de pozos se ha provisto ya de grupos de bombas de balancín o individuales. Se emplean grupos sencillos y gemelos con volante de bandaje, accionados por motores eléctricos o por motores de gas de cilindros múltiples. Las transmisiones corrientes son por engranaje, por correa trapezoidal o por cadena, entre el grupo motor y el volante de bandaje.

En todos los casos en que el nivel del líquido en el pozo se mantiene a una buena elevacion, las bombas centrífugas eléctricas, del tipo sum-

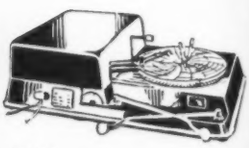
(Continué en Página 214)

The names that signify QUALITY *in any language*



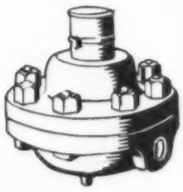
PITTSBURGH PISTON OIL AND GASOLINE METER

EMCO DOMESTIC METER



EMCO McGAUGHY INTEGRATOR

EMCO-NORDSTROM VALVE WITH LOCKING DEVICE FOR TANK BATTERY SERVICE



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COMPTEURS ET DISPOSITIFS DE RÉGLAGE

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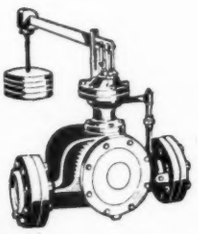
ROBINETS DE FERMETURE À GRAISSAGE

★★★

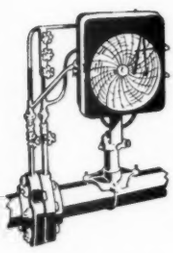
LOS NOMBRES QUE DENOTAN CALIDAD EN CUALQUIER LENGUA

LES NOMS QUE SIGNIFIENT QUALITÉ DANS N'IMPORTE QUELLE LANGUE



EMCO BALANCED VALVE REGULATOR

EMCO LARGE CAPACITY PRESSED STEEL GAS METER



EMCO ORIFICE METER

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PITTSBURGH EQUITABLE METER COMPANY

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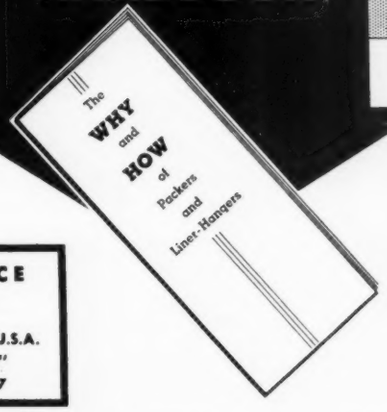
WORLD WIDE ACCEPTANCE BY THE OIL INDUSTRY

LANE-WELLS *Answers* the WHY and HOW of PACKERS and LINER HANGERS

WHY...
Use Packers?
BECAUSE...
they give you better control of your well conditions, and lower your production costs.
WHY...
Use Lane-Wells "Multiple Ring" Packers?
BECAUSE...
their construction assures you of
(1) An absolute seal.
(2) Positive control by operator.
(3) Ease of removal... This point is especially important, as all operators know. The series of Lane-Wells packing rings, made of multiple layers of graphite-impregnated fabric moulded over a rubber core, and alternating with metal expansion rings, positively will not vulcanize or stick to the casing—even under the most severe pressure and temperature conditions... That is why we recommend the "ring" type wherever possible, though we do make packers (and liner hangers) with packing elements of lead and plain rubber for special cases...
Another point for the "ring" type is...
(4) Economy... The entire tool can be salvaged (even after setting for years), cleaned up, packing element replaced and packer made ready for use again right on the job without sending it to a shop.
"Haven't Stuck Yet"
[3]
WHY...
Use Lane-Wells "Multiple Ring" Liner Hangers?
BECAUSE...
they employ the same basic principles that have made Lane-Wells Multiple-Ring Packers a great success—the same series of packing rings made of multiple layers of graphite-impregnated fabric moulded over and around a one-piece rubber core, giving positive insurance against vulcanizing and sticking to casing... If anything, this assurance of easy removal when desired is of greater importance in liner hangers than in packers, since the liner hanger usually remains in the well for a longer period of time...
The same points of economy in 100% salvage value and simplicity of renewing packing element, mentioned in connection with our Ring Packers, apply with equal force to Lane-Wells Liner Hangers.
Liner Setting and Re-Setting Tool, and Liner Setter Adapter
We furnish a liner setting tool which allows the safe use of threaded joint as a releasing connection, by providing a positive means of removing the weight of the setting string from the threads in connection with a rotary bump or jar.
For Full Description See Our Bulletin No. 1, Page 9
We also furnish a liner setter adapter, similar in design to the top collar of our liner hanger, and with a variety of uses. Adapters or top liner hanger collars, are also available for running Lane-Wells liner hangers on other types of setting tools.
For Full Description See Our Bulletin No. 1, Page 10
"Haven't Stuck Yet"
[11]

SEND FOR this CONCISE HANDBOOK



The Lane-Wells Co., Engineers & Manufacturers, offers a complete line of Packers and Liner Hangers in types to meet almost any condition encountered in both drilling and producing wells, where a packer should be used.

They are furnished to pack between tubing and casing, casing and casing, tubing and formation, and casing and formation, in four basic types: (1) Hook-wall; (2) Bottom-hole: (3) Anchor; and (4) Rat-hole.

The exclusive Lane-Wells Ring Packing Assembly consists of multiple rings built of many layers of heavy, graphite-impregnated, bias-cut canvas, moulded over and around a live rubber core, these rings alternating with metal expansion rings. This assembly eliminates all danger of vulcanizing to the casing, and assures a positive seal. . . . Other sleeves, or assemblies, of rubber, canvas, lead, belting or other materials are furnished to meet individual requirements. . . . Plain Liner Hangers, also, are furnished.

The Lane-Wells Liner Setting and Resetting Tool allows the use of a threaded joint as a releasable connection providing adequate strength to insure complete safety in setting the heaviest liner. The tool is packed, assuring positive circulation into the liner, and is threaded to permit the use of tubing below it for washing purposes.

The Lane-Wells Co. is also the developer and operator of the Lane-Wells Gun Perforator.

La Lane-Wells Co., ingenieros y fabricantes, ofrecen un surtido completo de empacadores y sujetadores de forros en tipos para satisfacer casi todas las condiciones que se encuentran en la producción y explotación de pozos petrolíferos, donde hay necesidad de emplear semejantes equipos.

Estos productos se suministran para empacar entre la tubería y la cubierta, entre cubierta y cubierta, entre tubería y formación y entre cubierta y formación, ofreciéndose en cuatro tipos principales: (1) pared de gancho, (2) hoyo de fondo, (3) ancla y (4) agujero de ratón.

El exclusivo grupo de empaquetadura anular Lane-Wells consta de anillos múltiples construídos de varias capas de lona gruesa grafitada y cortada al sesgo, moldeada aldredor de un núcleo de caucho elástico. Estos anillos se alternan con anillos metálicos de expansión. El grupo evita todo peligro de vulcanización a la cubierta y asegura un cierre positivo. Otros grupos o manguitos de caucho, lona, plomo, correaje y otros materiales, se suministran para satisfacer requisitos individuales. También se suministran sujetadores sencillos.

La herramienta de ajuste y reajuste Lane-Wells de canalización permite el empleo de una unión roscada, como una conexión desprendible, que provee adecuada firmeza para asegurar completa seguridad en la instalación de los forros más pesados. La herramienta está bien protegida por empaquetadura, asegurando positiva circulación en la canalización, y está roscada para permitir el uso de una tubería debajo de ella para el servicio de lavado.

La Lane-Wells Co. ha también y puesto en operación el perforador de pistola Lane-Wells.

EXPORT SERVICE
John H. Baird
General Manager
420 Lexington Ave., New York, U.S.A.
Cable Address "WELLSLANE"
Telephone MOhawk 4-4957

La Lane-Wells Co., Ingénieurs et Fabricants, offre un assortiment complet de garnitures et d'attache-canalisations, comprenant une variété suffisante de modèles pour faire face à la quasi-totalité des conditions d'emploi, tant pour le forage proprement dit que pour la mise en exploitation des puits pétrolifères, où il convient de faire usage d'une garniture.

Ces garnitures sont fournies pour garnir entre tubage et revêtement, revêtement et revêtement, tubage et gisement, revêtement et gisement, en quatre types de base : (1) Accroche-paroi; (2) Trou de fond: (3) Ancre: et (4) Trou de rat.

L'ensemble exclusif Lane-Wells de garniture à anneaux consiste d'anneaux multiples constitués par de nombreuses couches superposées de fort canevas, imprégné de graphite et coupé en biais, ce canevas étant moulé sur et autour d'un noyau de caoutchouc natif; ces anneaux sont alternés avec des anneaux métalliques a expansion. Cet ensemble supprime tout danger de vulcanisation de revêtement, et assure un joint d'une étanchéité positive. . . . Il est fourni aussi d'autres manches ou ensembles, en caoutchouc, canevas, plomb, courroie ou autres substances, afin de donner aux exigencies individuelles. . .

L'Outil Lane-Wells d'Ajustage et de Réajustage de canalisation permet l'emploi d'un joint fileté comme raccord détachable, ce qui assure une force suffisante pour donner toute la sécurité voulue à la mise en place de la canalisation la plus lourde. Cet outil est entouré de garniture, ce qui assure une circulation positive dans la canalisation, et il est fileté afin de permettre l'emploi de tubage au-dessous de son niveau, pour opération de lavage.

La Lane-Wells Co. a aussi créé et mis en service le Perforateur à Pistolet Lane-Wells.

Tomorrow's Tools - Today!

THE LANE-WELLS CO.
Engineers & Manufacturers

LOS ANGELES, CALIFORNIA o NEW YORK CITY, NEW YORK

THE LANE-WELLS CO OF TEXAS • HOUSTON & CORPUS CHRISTI • THE LANE-WELLS CO. OF OKLAHOMA • OKLAHOMA CITY & TULSA

PUMPS BUILT FOR THE OIL

For 20 years GASO has specialized in building pumps exclusively for the oil industry and thus designed to exactly meet oil industry requirements. All Gaso Pumps are characterized by sturdy design, few parts and rugged strength. A complete line of pumps is offered for oil field, pipe line and refinery use, with particular attention to pumps for pipe line service. GASO also offers a complete line of extra-rugged pipe line fittings.

Number 201. Rod Pump. Used in connection with rod line or shackle line between power and well, or connected to the power direct with a pitman. Capacity 31 to 41 bbls. per hour.

Number 301. Piston Power Pump (Jerker Pattern). Widely used where a push and pull or crank power can be utilized. Capacities 32 to 157 bbls. per hour, at 750 to 300 lbs. pressure.

Number 601. Walking Beam Pump for oil or water. Designed for 400 and 600-pound working pressures. Capacities 30 to 55 bbls. per hour.

Number 604. Walking Beam Pump for gas or vacuum. Will stand hard usage.

Number 1844. Power Pump Unit with combination Gas and Gasoline Engine. Capacities from 50 bbls. per hour at 650 lbs. pressure, to 128 bbls. at 350 lbs. pressure.

Number 1509. All Timken Bearing Pump. Capacities from 63 bbls. per hour at 800 lbs. working pressure, to 250 lbs. at 250 lbs. pressure.

Number 2019. Portable Pumping Plant. Capacities from 63 bbls. per hour at 800 lbs. working pressure to 250 lbs. at 250 lbs. pressure.

Number 1740. Power Pump with "V" Rope Drive from Natural Gas and Gasoline Engine. Capacities 54 bbls. per hour at 1400 lbs. working pressure, to 250 bbls. at 600 lbs. pressure.

Number 1741. Power Pump with Diesel Engine drive. For long oil or water lines. Capacities 250 lbs. per hour at 600 lbs. working pressure, to 502 bbls. at 300 lbs. working pressure.

Number 1742. Interchangeable Liner Pump, Side Pot Type, driven by Electric Motor. Capacities from 54 bbls. per hour at 1400 lbs. pressure, to 250 bbls. at 600 lbs. pressure.

Number 1931. Pump for Water Systems, Gathering Lines or Booster Stations. Admirably suited for suction service. Capacities from 377 bbls. per hour at 225 lbs. pressure, to 1045 bbls. per hour at 175 lbs. pressure.

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Pompes Construites Exclusivement Pour L'Industrie Du Pétrole

Depuis 20 ans, GASO est spécialisé dans la construction des pompes exclusivement destinées à l'industries du pétrole, et, partant, répondant rigoureusement aux exigences de l'industries pétrolière. Toutes les pompes Gaso se signalent par la construction robuste, le petit nombre d'organes et la résistance en service. Il en est offert une série complète pour le service des champs de pétrole, des canalisations de transport et le raffinement, avec un choix particulièrement bien monté pour le service des canalisations de transport. GASO offre aussi une série complète de garnitures de conduites extra-robustes.

Numéro 201. Pompe à tige. S'emploie en relation avec les conduites à tiges ou à jumelles entre le groupe-moteur et le puits, ou encore reliée directement au groupe-moteur au moyen d'une bielle le connexion. Débit de 31 à 41 barils à l'heure.

Numéro 301. Autopompe à piston (Type Jerker). S'emploie couramment chaque fois qu'on peut faire emploi d'un groupe à manivelle ou tire et pousse. Débits de 32 à 157 barils à l'heure, à une pression de 750 lbs. à 300 lbs.

Numéro 601. Pompe à culbuteur de soupape pour pétrole ou eau. Prévue pour des pressions de travail de 400 et 600 lbs. Débits de 30 à 55 barils à l'heure.

Numéro 604. Pompe à culbuteur de soupape pour gaz ou vide. Résiste en service dur.

Numéro 1844. Groupe autopompe avec moteur combinaison gaz et essence. Débits de 50 barils à l'heure à une pression de 650 lbs., à 128 barils à 350 lbs. de pression.

Numéro 1509. Pompe entièrement sur roulements Timken. Débits allant de 63 barils à l'heure à une pression de travail de 800 lbs., à 250 barils à 300 lbs. de pression.

Numéro 2019. Groupe de pompage portatif. Débits allant de 63 barils à l'heure à 800 lbs. de pression de travail, à 250 barils à 300 lbs. de pression.

Numéro 1740. Autopompe avec commande à câble trapézoïdal sur moteur à gaz naturel et à essence. Débits allant de 54 barils à l'heure à une pression de travail de 1400 lbs. à 250 barils à 600 lbs. de pression.

Numéro 1741. Autopompe actionnée par moteur Diesel. Destinée au service des longues conduites à pétrole ou à eau. Débits allant de 250 lbs. à l'heure à une pression de travail de 600 lbs., à 502 barils à 300 lbs. de pression de travail.

Numéro 1742. Pompe à revêtement interchangeable. Type à cuvette latérale, actionnée par moteur électrique. Débits allant de 54 barils à l'heure à 1400 lbs. de pression, à 250 barils à 600 lbs. de pression.

Numéro 1931. Pompe pour systèmes hydrauliques, conduites de centralisation ou stations de renfort. Convient admirablement au service d'aspiration. Débits allant de 377 barils à l'heure à l'heure à 225 lbs. de pression, à 1045 barils à l'heure à 175 lbs. de pression.

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Export Office: 149

GASO

EXCLUSIVELY INDUSTRY

Насосы, построенные исключительно для нефтяной индустрии.

Фирма GASO втечение 20-ти лет специализируется по изготовлению насосов исключительно для нефтяной индустрии, вследствие чего насосы этой фирмы сконструированы так, чтобы в точности отвечать всем требованиям этой индустрии. Все насосы GASO характерны по крепости своей конструкции, малому количеству отдельных частей и большой выносливости. Фирма изготовляет все типы насосов, потребные для нефтяных промыслов, трубопроводов и перегонных заводов. Особое внимание уделено насосам для трубопроводов. Фирма GASO также изготовляет всевозможную и чрезвычайно прочную арматуру для трубопроводов.

Номер 201. Штанговый насос. Он присоединяется либо к лодевым насосным штангам, либо к соединительным частям этих штанг и устанавливается между двигателем и скважиной или соединяется непосредственно с двигателем при помощи шатуна. Производительность от 31 до 41 баррелей в час.

Номер 301. Поршневой приводный насос (типа Jarker). Широко применяется там, где можно утилизировать работу механизмов, движущихся вперед и назад, или работу кривошипа. Производительность от 32 до 157 баррелей в час при давлении от 750 до 300 англо-фунтов.

Номер 601. Насос, работающий от балансира, применяется для откачки нефти или воды. Сконструирован для рабочего давления от 400 до 600 англо-фунтов. Производительность от 30 до 55 баррелей в час.

Номер 604. Насос, работающий от балансира; применяется для откачки газа или для вакуумных установок. Пригоден для тяжелых условий работы.

Номер 1844. Приводная насосная установка с комбинированным двигателем для работы газом или газолином. Производительность от 50 баррелей в час при давлении в 650 англо-фунтов, до 128 баррелей в час при давлении в 350 англо-фунтов.

Номер 1509. Насос, работающий целиком в подшипниках Timken. Производительность от 63 баррелей в час при рабочем давлении в 800 англо-фунтов, до 250 баррелей в час при рабочем давлении в 300 англо-фунтов.

Номер 2019. Переносная насосная станция. Производительность от 63 баррелей в час при рабочем давлении в 800 англо-фунтов, до 250 баррелей в час при рабочем давлении в 300 англо-фунтов.

Номер 1740. Приводный насос с приводными ремнями формы "V", работающий от комбинированного газового и газолинового мотора. Производительность от 54 баррелей в час при рабочем давлении в 1400 англо-фунтов, до 250 баррелей в час при рабочем давлении в 600 англо-фунтов.

Номер 1741. Приводный насос, работающий от Дизель-мотора. Применяется для длинных нефтепроводов или водопроводов. Производительность от 250 баррелей в час при рабочем давлении в 600 англо-фунтов, до 502 баррелей в час при рабочем давлении в 360 англо-фунтов.

Номер 1742. Насос со съемными цилиндровыми втулками. Работает от электро-мотора. Производительность от 54 баррелей в час при давлении в 1400 англо-фунтов, до 250 баррелей в час при давлении в 600 англо-фунтов.

Номер 1931. Насос для водопроводных систем, отборных линий или для водонапорных станций. Превосходно приспособлен для всасывания жидкости. Производительность от 377 баррелей в час при давлении в 225 англо-фунтов, до 1045 баррелей в час при давлении в 175 англо-фунтов.

Требуйте наш комплектный каталог.

Bombas Construidas Exclusivamente Para La Industria Del Petróleo

Por 20 años, la GASO se ha dedicado con especialidad a la construcción de bombas para uso exclusivo en la industria del petróleo, proyectándolas para responder con toda exactitud a los requisitos de los petroleros. Todas las bombas Gaso se caracterizan por sólida construcción, pocas piezas y gran duración. Se ofrece una serie completa de bombas para yacimientos petrolíferos, sistemas oleoconductores y refinerías, con particular atención a las empleadas en oleoconductores. La Gaso ofrece también un surtido completo de conexiones y accesorios para sistemas oleoconductores, de fina calidad.

Número 201. Bomba de vástago. Se usa en conexión con la linea de vástago o linea de enganche entre el motor y el pozo, o conectada directamente al motor mediante biela de conexión. Capacidad de 31 a 41 barriles por hora.

Número 301. Bomba de émbolo de fuerza (tipo Jerker). De extensa aplicación en lugares donde puede utilizarse un equipo intermitente de su clase. Capacidades de 32 a 157 barriles por hora, a presión de 750 a 300 libras.

Número 601. Bomba de viga movible, para petróleo y agua. Proyectada para presiones de trabajo de 400 y 600 libras. Capacidades de 30 a 55 barriles por hora.

Número 604. Bomba de viga movible, para gas y vacio. Resiste el uso más severo.

Número 1844. Unidad o grupo de bomba de fuerza con combinación de motor de gas y gasolina. Capacidades de 50 barriles por hora a 650 libras de presión a 128 barriles a 350 libras de presión.

Número 1509. Bomba montada completamente en cojinetes Timken. Capacidades de 63 barriles por hora a 800 libras de presión de trabajo a 250 barriles a 300 libras de presión.

Número 2019. Planta de bomba portátil. Capacidades de 63 barriles por hora a 800 libras de presión de trabajo a 250 barriles a 300 libras de presión.

Número 1740. Bomba de fuerza con transmisión por cable en V de motor de gas natural o motor de gasolina. Capacidades de 54 barriles por hora a 1400 libras de presión de trabajo a 250 barriles a 600 libras de presión.

Número 1741. Bomba de fuerza con propulsión por motor diésel. Para grandes tuberias de petróleo o de agua. Capacidades de 250 barriles por hora a 600 libras de presión de trabajo a 502 barriles a 300 libras de presión.

Número 1742. Bomba de manguito de cilindro intercambiable, tipo de receptácula lateral, accionada por motor eléctrico. Capacidades de 54 barriles por hora a 1400 libras de presión de trabajo a 250 barriles a 600 libras de presión.

Número 1931. Bomba para sistemas de agua, tuberías de recolección y estaciones de amplificación. Admirablemente adecuadas a servicio de aspiración. Capacidades de 377 barriles por hora a 225 libras de presión, a 1045 barriles por hora a 175 libras de presión.

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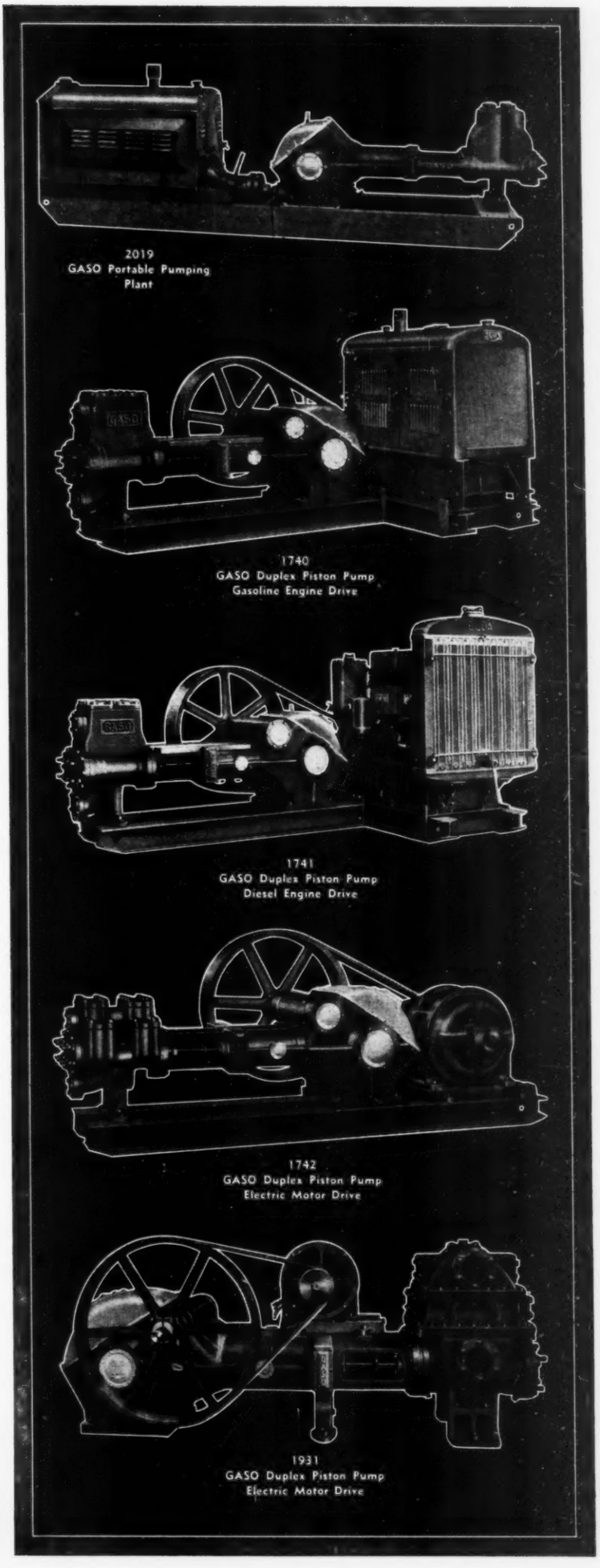


2019
GASO Portable Pumping Plant

1740
GASO Duplex Piston Pump
Gasoline Engine Drive

1741
GASO Duplex Piston Pump
Diesel Engine Drive

1742
GASO Duplex Piston Pump
Electric Motor Drive

1931
GASO Duplex Piston Pump
Electric Motor Drive

COMPANY -:- Tulsa, Okla.
Broadway, New York

PUMPS

(Continued from Page 209)

have been centered around the necessity of having to free the lost tools before they can be removed. Methods of "washing over" have advanced. However, equipment and practice in fishing remains essentially unchanged, recent efforts having been to avoid them, rather than to facilitate the recovery. Each fishing job is a problem in itself, and the equipment needed for any one may differ from equipment designed for other jobs. Acid is often used in an attempt to loosen tools which become stuck in limestone.

PUMPING DEEP WELLS

Wells more than 5,000 feet deep have presented many problems in production. About six methods have been employed in the Oklahoma City field: natural flow, gas-lift and various gas-lift devices, electrical submerged centrifugal pumps, pneumatic pumping cylinders, walking beam and individual pumping units and hydraulic submerged pumps.

When wells cease to flow naturally it has been common practice to install gas-lift equipment. Further decline in production necessitated installation of some other type of equipment and many wells have been equipped with beam outfits or individual pumping units. Bandwheel single-crank and twin-crank units are used and powered with either electric motors or multicylinder gas engines. Gear, V-belt or chain drives are used between power unit and bandwheel.

So long as the fluid level in the well is fairly high the submergible type centrifugal electric pumps have been very satisfactory. These units can handle from 1,200 to 1,400 bbls. of fluid daily. By combining gas-lift and submerged centrifugal pumps as much as 6,000 bbls. of fluid has been handled each day.

Another unit used in Oklahoma City with success has been the plunger lift. The plungers operate in 2½- or 3-inch special strings of tubing and are actuated by gas from the formation or furnished by compressors.

The pneumatic pumping cylinders are connected to regular sucker-rods and operate with steam or compressed air or gas. Gas is usually used and about 1,000,000 feet is required per 24 hours at a pressure of about 325 pounds. The gas is recycled and only a small quantity has to be added to make up for gas lost through leakage.

A new method tried in the Oklahoma City field consists of an hydraulic lift. Fluid is pumped down a string of 1¼-inch tubing to move a plunger in a working barrel at the bottom of the well. The first plunger is direct connected with a second plunger which discharges into the 2½-inch string of tubing. The fluid used to actuate the plunger and the oil from the well are both delivered to the surface in this manner. Filtered oil is used for the power fluid and it may be preheated to combat precipitation of paraffin in the tubing. At the surface the power pumps, filters, heater, gas separator and clock control switches are installed and the pump and filter may be powered with electric motor.

STRIPPER WELLS

Pumping stripper wells is usually done with central power units. Because of the light loads it has been customary to pump from 15 to 20 wells from one power. While this has resulted in economy in power more recent practice has tended toward fewer wells for each power because it has been found more than 8 or 10 wells put too much work on the leaseman and he is unable to get around to greasing all pull rod blocks and properly attending to a greater number of wells, causing an increase in power consumed and less attention to up-keep, so what was saved in power has been partially consumed by increased cost.

(Continued on Page 217)

(Continué de Page 209)

moteurs électriques, soit par des moteurs à essence à cylindres multiples. On fait emploi de transmissions à engrenages, à courroie trapézoïdale ou à chaîne entre le groupe moteur et le volant à bandage.

Dans tous les cas où le niveau du fluide dans le puits s'est maintenu assez élevé, les pompes centrifuges électriques du type submersible ont donné entière satisfaction. Ces groupes sont à même de pomper de 1.200 à 1.400 barils de fluide par jour. En combinant les pompes centrifuges du type submergé à l'élévateur de gaz, on est arrivé à pomper jusqu'à 6.000 barils de fluide par jour.

Un autre appareil qui a été employé avec succès à Oklahoma City a été l'élévateur à plongeur. Les plongeurs fonctionnent dans des faisceaux de tubage de 2½ ou 3 pouces, et sont actionnés par des gaz émanant de la formation ou fournis par des compresseurs.

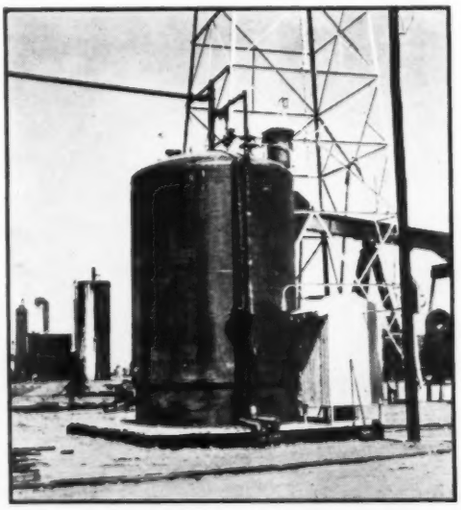
Les cylindres pneumatiques de pompage sont reliés à des tiges d'aspiration du type courant, et fonctionnent à la vapeur ou à l'air comprimé ou sous l'action des gaz. On emploie généralement les gaz, dont il faut environ 1.000.000 de pieds toutes les 24 heures sous une pression d'environ 325 lbs. Ces gaz peuvent être réemployés dans le cycle, et on n'a besoin d'y ajouter qu'une petite quantité de gaz pour compenser les pertes de gaz dues aux fuites.

Une nouvelle méthode qui a été essayée dans de chantier d'Oklahoma City a recours à un élévateur hydraulique. On pompe le fluide dans un faisceau de tubage de 1¼ pouce afin d'actionner un plongeur dans un baril travaillant au fond du puits. Le premier plongeur est relié directement à un deuxième plongeur dont la décharge est prévue dans le faisceau de tubage de 2½ pouces. Le fluide employé pour actionner le plongeur, ainsi que le pétrole provenant du puits, sont tous deux amenés à la surface de cette manière. On emploie du pétrole filtré comme fluide moteur, qu'on peut chauffer au préalable pour prévenir la précipitation de paraffine dans le tubage. A la surface, on fait l'installation de pompes mécaniques, de filtres, d'un réchauffeur, d'un séparateur de gaz et de commutateurs à commande à minuterie, et on peut faire emploi d'un moteur électrique pour actionner la pompe et le filtre.

PUITS EXTRACTEURS

Le pompage des puits extracteurs se fait en général au moyen de groupes-force centraux. A cause des faibles charges en jeu, il a été d'usage de pomper de 15 à 20 puits avec un groupe-force unique. Bien que cette façon de procéder ait assuré des économies de force motrice, la tendance plus récente a été de réduire le nombre de puits

(Continué sur Page 217)



Electric dehydrator

(Continué de Página 209)

ergible, han dado completa satisfacción. Estos grupos pueden manejar de 1.200 a 1.400 barriles de líquido al día. Combinando las bombas centrífugas, de tipo sumergido, con elevadores de gas, se he llegado a extraer hasta 6.000 barriles de líquido al día.

Otro aparato, que se ha empleado con éxito en Oklahoma City, ha sido el elevador de émbolo o buzo. Estos elevadores funcionan en tuberías de 2 ½ o 3 pulgadas y se accionan mediante el gas emanado de la misma formación o suministrado por compresores.

Los cilindros neumáticos de bombaje se conectan a tubería de aspiración de tipo corriente, y funcionan con vapor o con aire comprimido o bajo la acción del gas. Se emplea generalmente el gas, del cual se requiere como 1.000.000 de pies, para cada 24 horas, bajo presión de como 325 libras. Este gas se emplea de nuevo en el ciclo, y por esta razón, no hay necesidad de añadir sino una pequeña cantidad de gas, para compensar las pérdidas de gas debidas a escapes.

Un nuevo método ensayado en los yacimientos de Oklahoma City, se vale de un elevador hidráulico. Mediante bomba, el flúido se mete en una tubería de 1¼ pulgada, para que vaya a accionar un émbolo en un cilindro de trabajo dispuesto al fondo del pozo. El primer émbolo está conectado directamente a un segundo émbolo, con descarga en tubería de 2½ pulgadas. El flúido empleado para accionar el émbolo, lo mismo que el petróleo proveniente del pozo, son levantados así, al mismo tiempo, a la superficie. Se emplea petróleo filtrado, como flúido de accionamiento, y en muchos casos, se le recalienta de antemano, para evitar la precipitación de la parafina en la tubería. En la superficie se hace la instalación de bombas mecánicas, filtros, recalentador, separador de gas y conmutadores de control especial, empleándose, por lo general, un motor eléctrico, para accionar la bomba y el filtro.

POZOS EXTRACTORES

El bombaje de los extractores se realiza, en general, mediante grupos motores centrales. A causa de las livianas cargas presentes, se ha seguido la práctica de utilizar un solo grupo motor central para el bombaje de 15 a 20 pozos. A pesar de que este procedimiento representa ordinariamente una considerable economía en fuerza motriz, la tendencia más reciente ha sido hacia reducir el número de pozos por cada grupo motor central, en vista de que se ha constatado el hecho de que más de 8 o 10 pozos dan al concesionario o explotador tanto trabajo que apenas tiene tiempo para preocuparse periódicamente del engrase del equipo de extracción y para dar debida atención a semejante limitado número de pozos. Por esta razón, con un mayor número de pozos, lo que se gana en economía de fuerza motriz, se pierde en gastos de reparaciones provocados por el descuido de una gran parte del equipo.

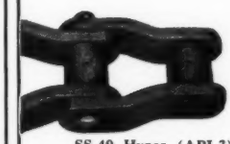
Un estudio de los gastos de producción de estos pozos ha mostrado que cerca del 65% queda absorbido por labor manual, 22% por reparaciones, 6% por piezas de repuesto y otros abastecimientos, y 7% por transporte, combustible y agua. Por la inclusión de un menor número de pozos en cada unidad motriz central, los gastos por labor manual aumentan un tanto, pero los gastos de reparación se reducen notablemente. Por otra parte, se evitan considerablemente las paralizaciones de la explotación, lo que conduce a aumentar el rendimiento y las ganancias del trabajo. Otra ventaja de este nuevo método.

Los pequeños grupos de bombaje individuales, accionados por motor, han tenido también aceptación en los programas de extracción de esta clase de pozos. Cuando estos pequeños grupos están gobernados por controles cronométricos, los gastos por labor manual se reducen considerablemente,

(Continué en Página 217)

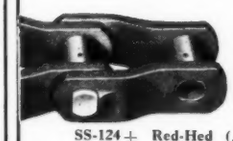
SS-40 (API-3)

SS-40 + Red-Hed (API-3)



SS-40 Hyper (API-3)

SS-124 (API-4)



SS-124 + Red-Hed (API-4)

SS-124 Two Bar Hyper (API-4)

SS-124 Hyper de dos barras (API-4)

SS-124 Hyper à deux barres (API-4)

SS-124 Three Bar Hyper (API-4)

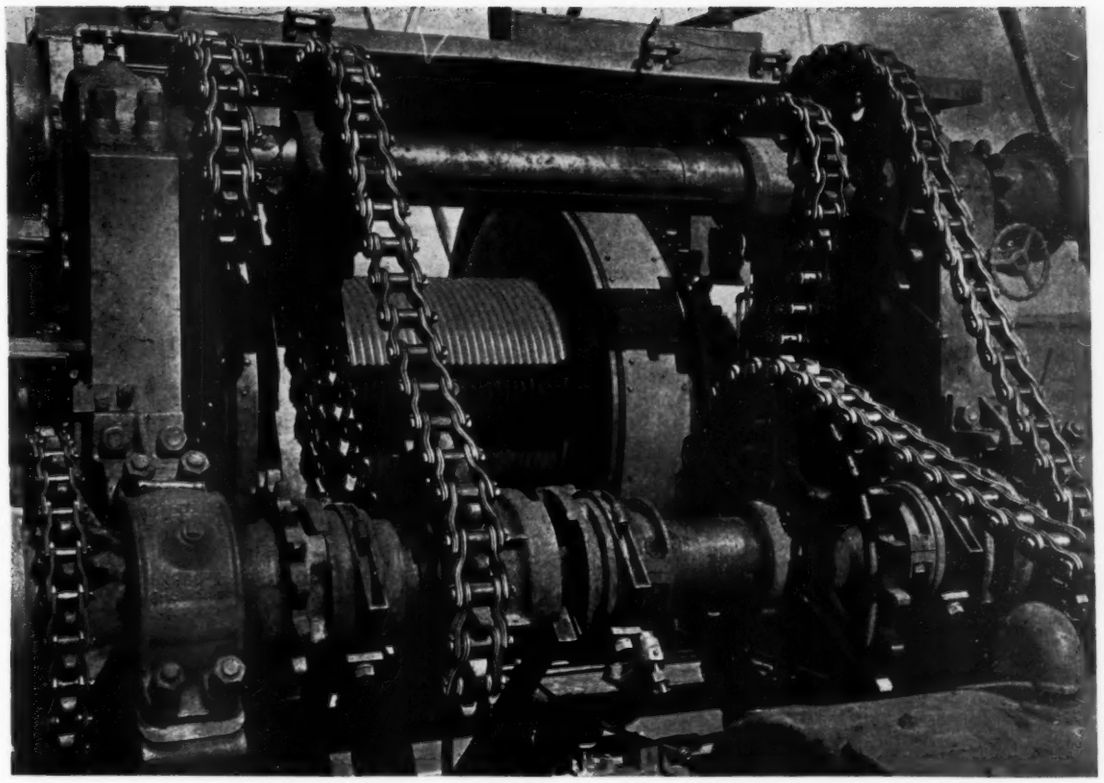
SS-124 Hyper de tres barras (API-4)

SS-124 Hyper à trois barres (API-4)

Silverlink Finished Steel Roller Chain for drilling, servicing and pumping equipment.

Cadena Silverlink de rodillos de acero acabado, para equipo de perforación, de servicio y de bomba.

Chaîne à rouleaux Silverlink en acier fini, pour matériel de forage, d'entretien et de pompage.



A Chain for Every Drilling Service

● Link-Belt Company pioneered in the art of chain making and are today the leading manufacturers of chains for power transmission and conveying purposes. Link-Belt chains, as illustrated, are extensively used in the oil industry throughout the world and the "SS" class chains, built to A.P.I. dimensions, provide a suitable chain for every drilling service regardless of depth or type of formation.

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Pitch Inches	Approx. Links in 10 Ft.	Link-Belt Chain Number and Ultimate Strength, Pounds	Net Weight Per Foot, Pounds	Packed for Export Per 100 Feet	
				Approx. Gross Wt., Lbs.	Approx. Cu. Feet.
3.075	39	SS-40 (API-3), 28,000	6.8	765	9
4.063	30	SS-124 (API-4), 60,000	14.6	1,610	18
3.075	39	SS-40+ Red-Hed(API-3) 48,000	6.8	765	9
4.063	30	SS-124+ Red-Hed (API-4), 112,000	15.6	1,710	18
3.075	39	SS-40 Hyper (API-3), 75,000	8.3	915	9
4.063	30	SS-124 Two Bar Hyper (API-4), 130,000	16.1	1,760	18
4.063	30	SS-124 Three Bar Hyper (API-4), 170,000	16.3	1,780	18

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Una Cadena para cada Servicio de perforación

● La Link-Belt Company fué una de las primeras en perfeccionar el arte de hacer cadenas y hoy es la fábrica más grande de cadenas para transmisión de fuerza y trabajos de transporte. Las cadenas Link-Belt aquí ilustradas, se usan mucho en la industria petrolera, en todas partes del mundo. Las cadenas de la clase "SS", construídas según los patrones del A.P.I., proveen un tipo idealmente adecuado a todo servicio de perforación, sin relación de profundidad o tipo de formación del pozo petrolífero.

La marca comercial de doble flecha >—< sirve de identificación a las legítimas cadenas Link-Belt. Las especificaciones son las siguientes:

Paso, en pulgs.	No. aprox. de eslabones por cada 10 pies	No. de cadena Link-Belt y fuerza final en libras	Peso neto por pié en libras	Embalada para la exportación cada 100 pies	
				Peso bruto aproximado en libras	Dimensión cúbica aprox.
3.075	39	SS-40 (API-3), 28,000	6.8	765	9
4.063	30	SS-124 (API-4), 60,000	14.6	1,610	18
3.075	39	SS-40+Red-Hed (API-3) 48,000	6.8	765	9
4.063	30	SS-124+Red-Hed (API-4), 112,000	15.6	1,710	18
3.075	39	SS-40 Hyper (API-3), 75,000	8.3	915	9
4.063	30	SS-124 Hyper de dos barras, (API-4), 130,000	16.1	1,700	18
4.063	30	SS-124 Hyper de tres barras, (API-4), 170,000	16.3	1,780	18

DEPARTAMENTO DE EXPORTACION: 2680 Woolworth Bldg., Nueva York, N. Y., E. U. A. Dirección por radio y telégrafo: "LINKBELT-NEW YORK"

Une Chaîne pour Chaque Service de Forage

● La Link-Belt Company a été un pionnier dans l'art de la fabrication des chaînes, et est à l'heure actuelle en tête des fabricants de chaînes destinées à la transmission de la force motrice ou à l'entraînement des transporteurs. Les chaînes Link-Belt, telles celles de la gravure ci-dessus, sont d'un emploi très répandu dans l'industrie du pétrole dans le monde entier, et les chaînes de la classe "SS", construites d'après les cotes A.P.I., permettent de sélectionner la chaîne appropriée à chaque service de forage, quel que soit le type ou la profondeur du gisement exploité.

La marque de fabrique à double flèche >—<, identifie les chaînes Link-Belt véritables. En voici les caractéristiques:

Pas en pouces	Nbre approx. de maillons par 10 pieds	Numéro de chaîne et charge de rupture Link-Belt, en livres	Poids net par pied, en livres	Emballées pour l'exportation par 100 pieds	
				Poids brut approx. en livres	Pieds cubes approx.
3.075	39	SS-40 (API-3), 28,000	6.8	765	9
4.063	30	SS-124 (API-4), 60,000	14.6	1,610	18
3.075	39	SS-40+Red-Hed API-3), 48,000	6.8	765	9
4.063	30	SS-124+Red-Hed (API-4), 112,000	15.6	1,710	18
3.075	39	SS-40 Hyper, (API-3), 75,000	8.3	915	9
4.063	30	SS-124 Hyper à deux barres, (API-4), 130,000	16.1	1,760	18
4.063	30	SS-124 Hyper à trois barres, (API-4), 170,000	16.3	1,780	18

BUREAUX D'EXPORTATION: 2680 Woolworth Bldg., New York, N. Y. Adresse télégraphique: "LINKBELT-NEW YORK"

LINK-BELT COMPANY

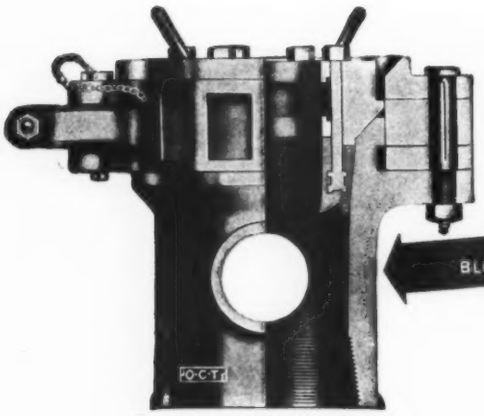
5848

INDIANAPOLIS CHICAGO NEW YORK PHILADELPHIA LOS ANGELES HOUSTON DALLAS

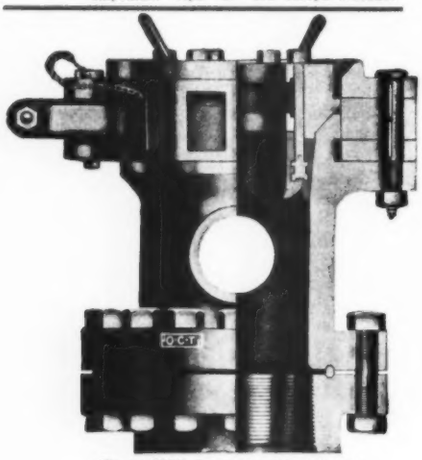
OKLAHOMA CITY, (W. H. Abele, Box 305, Route 4)

LINK-BELT

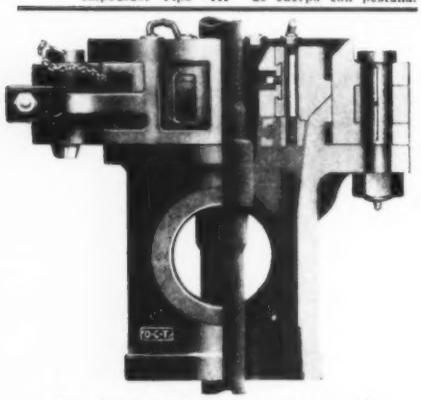
ROTARY DRILLING CHAINS



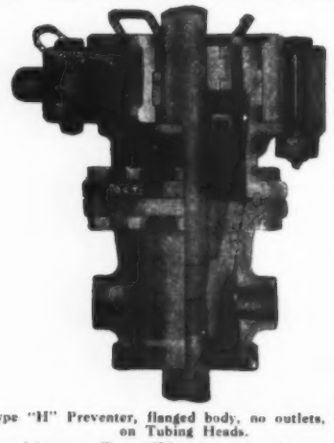
Type "D" Preventer, threaded body.
Pare-éclatement Type "D", corps fileté.
Impedidor Tipo "D" con cuerpo roscado.



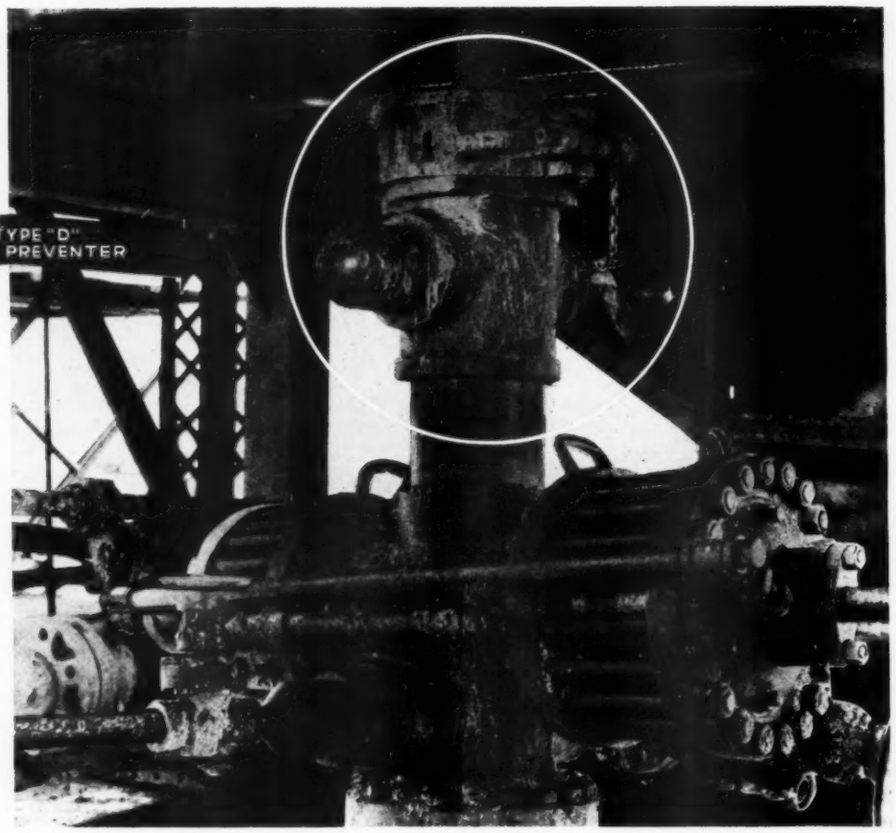
Type "HF" Preventer, flanged body.
Pare-éclatement Type "HF", corps nervuré.
Impedidor Tipo "HF" de cuerpo con pestaña.



Type "D" Preventer with new stripper rubber.
Pare-éclatement Type "D" avec nouveau caoutchouc dévêtisseur.
Impedidor Tipo "D" con nuevo separador de caucho.



Type "H" Preventer, flanged body, no outlets, for use on Tubing Heads.
Pare-éclatement Type "H", corps nervuré, sans orifices, pour emploi sur têtes de tubage.
Impedidor Tipo "H" de cuerpo con pestaña, sin salidas, para uso en cabezas de tuberías.



IN ANY LANGUAGE O-C-T ON THE Blowout Preventer Means SAFETY on the Well!

The O-C-T Blowout Preventer permits drilling in and landing casing or tubing against pressure in absolute safety. Its patented design provides a positive seal around any size drill pipe, casing, or tubing—either standard or flush joint—yet it permits the pipe to be rotated or raised and lowered to prevent sticking.

Simplicity of design and ease of operation are outstanding features of the O-C-T Preventer. Briefly, it consists of: a nickel chrome steel body which either screws or flanges to the pipe, the inside diameter of the body being the same as that of the pipe on which it is used; and a pack-off assembly which latches around the inner pipe and seats in the tapered bowl of the body, and which is locked in position by means of eccentric bands which are hinged to the body. Pack-off rubbers are lipped so that the greater the well pressure the tighter the seal around the pipe.

Parts for all types O-C-T Preventers are interchangeable. The accompanying sectional drawings show that the basic principle of design in all types is the same.

DANS TOUTES LES LANGUES O-C-T SUR LE Pare-éclatement signifie SECURITÉ sur le puits!

Le pare-éclatement O-C-T permet d'effectuer en toute sécurité le forage et la pose des revêtements ou du tubage en présence de fortes pressions. Son système breveté assure une étanchéité positive autour de tout calibre de tuyau, revêtement ou tubage de forage—soit joint standard, soit joint affleurant—et pourtant permet de faire tourner le tuyau, ou de l'élever ou l'abaisser, afin d'éviter le coinçage.

La simplicité du tracé et la facilité de manoeuvre sont les traits saillants du pare-éclatement O-C-T Brièvement, il se compose de: un corps en acier au nickel-chrome qui se visse ou se bride au tuyau, le diamètre intérieur du corps étant le même que celui du tuyau sur lequel il est employé; et un ensemble de bourrage qui épouse étroitement le tuyau intérieur et prend appui dans le bol conique du corps, et qui, en outre, se verrouille en place au moyen de bandes excentriques qui sont articulées au corps. Il est prévu des caoutchoucs de bourrage dont les bords sont tels que, plus la pression du puits est forte, plus le joint est serré autour du tuyau.

Les pièces pour tous types de pare-éclatement sont interchangeables. Les dessins en coupe ci-contre font ressortir que le principe de base de la construction est le même pour tous les types.

¡EN TODO IDIOMA O-C-T SOBRE EL Impedidor de Explosión Significa SEGURIDAD en el Pozo!

El impedidor de explosión O-C-T facilita la perforación y la instalación de revestimientos y tuberías, contra fuerte presión, con absoluta seguridad. Su construcción patentada provee un cierre positivo alrededor de cualquier tamaño de tubo de taladro, revestimiento o tubería, con junta normal o machihembrada ras en ras, permitiendo la rotación, la subida y la bajada del tubo, sin trabarse o atascarse.

Sencillez en construcción y facilidad de funcionamiento son los rasgos sobresalientes del impedidor O-C-T. En resúmen, consiste en lo siguiente: un cuerpo de acero al níquel y cromo, que se atornilla o se asegura por pestaña, en el tubo; el diámetro interior del cuerpo es igual al del tubo en que se emplea, y luego hay un conjunto que se cierra alrededor del tubo interior, descansando en el soporte cónico del cuerpo, quedando en posición fija mediante bandas excéntricas, que están abisagradas al cuerpo. Las empaquetaduras de caucho están graduadas de modo que imparten un cierre más apretado alrededor del tubo a medida que crece la presión del pozo.

Las piezas de todos los tipos de impedidor O-C-T son intercambiables. Los presentes grabados seccionales muestran el principio fundamental de la construcción de todos estos tipos, el cual es idéntico en todos ellos.

(Continued from Page 214)

A study of cost of producing stripper wells indicates about 65 per cent goes for labor, 22 per cent for repairs, 6 per cent to lease repairs and supplies and 7 per cent to transportation, fuel and water. With the smaller powers labor may have increased somewhat but repairs have been materially decreased and shutdown time has been appreciably reduced and income correspondingly increased.

Small individual pumping units motor driven have also found a place in stripper well pumping programs and where they are controlled by time clocks labor costs have been cut and production increased. Another advantage gained by this individual type unit has been salvage as it is possible to move units from well to well as production varies, impossible with central power units.

REPRESSURING

Repressuring of partially drained oil fields has been practiced for more than 25 years but during the past five years there has been more progress made than during the previous 20 years. New improvements are coring of producing formations; core analysis; packer application; pattern well

Mud spray for cooling hot mud

spacing; use of gas and air-gas mixtures; measurements of air-gas input and output volumes; control of air-gas production; electrification of leases; unit operations and use of better equipment.

In the past, operators used old wells for input of gas and attempted recovery from other old wells but modern practice contemplates drilling of new wells according to a pattern suited to the particular lease and securing representative cores of the producing formation. These cores are taken to special laboratories for detailed study and permeability, expressed in the unit of Darcys, is determined; porosity in per cent of pore space ascertained and content of the sample in oil, gas and water carefully measured. The grain size is determined, and sometimes the composition of the materials in the producing section is studied.

After the logs are correlated the next step is to determine the type and size of input strings of tubing. It is not good practice to force air or gas into the hole and trust to luck it will find its way into the formation still containing recoverable oil. The oil recovered from any reservoir seldom is withdrawn evenly from all parts of the formation. The more permeable strata will give up oil more

(Continué de Page 214)

par groupe-force, par suite du fait qu'on a constaté que plus de 8 à 10 puits donnaient trop de travail au gardien de la concession, ne lui permettant pas de graisser assez souvent tous les blocs de tiges d'extraction et de donner le soin voulu à un tel nombre de puits, d'où une augmentation de consommation de force motrice et un entretien négligé. de sorte que la première économie de force motrice et un entretien négligé, de sorte que la première économie de force motrice se trouvait absorbée par l'accroissement des frais d'exploitation.

Une étude des frais de production des puits dits extracteurs ou dépouilleurs a révélé environ 65 pour cent absorbés par la main-d'oeuvre, 22 pour cent pour les réparations, 6 pour cent pour la location des pieces de réparation et des fournitures, et 7 pour cent pour le transport, le combustible et l'eau. Par la décentralisation des groupes-force, les frais de main-d'oeuvre peuvent augmenter tant soit peu, mais les frais de réparation sont nettement abaissés et les temps d'arrêt dans l'exploitation fortement réduits, de sorte que les revenus de l'extraction se trouvent améliorés.

Les petits groupes de pompage individuels, mus par moteur, ont aussi trouvé une place dans les programmes de pompage de puits extracteurs, et dans les cas où leur contrôle est réglé par des minuteries, les frais de main-d'oeuvre ont été réduits et la production accrue. Un autre avantage que l'on doit à ce type individuel de groupe de pompage réside dans le sauvetage qu'il permet, par suite du fait qu'on peut déplacer les groupes d'un puits à l'autre selon les variations de la production, ce qui n'est pas réalisable dans le cas des groupes-force de centralisation.

RETABLISSEMENT DE LA PRESSION

Il y a déjà plus de 25 ans qu'on pratique le rétablissement de la pression dans des champs pétrolifères partiellement épuisés, mais au cours des cinq dernières années, on a accompli davantage de progrés dans ce domaine que pendant les 20 années qui ont précédé. Citons parmi les nouveaux perfectionnements: le carottage des formations en exploitation, l'analyse des carottes échantillons, l'application de bourrage, l'escapement des puits de prospection, l'emploi de mélanges de gaz et d'air-gaz, les mesures des volumes air-gaz à l'entrée et à la sortir, le contrôle de la production air-gaz, l'électrification des lieux de concession, la centralisation des operations et l'emploi d'un meilleur matériel.

Dans le passé, les exploiteurs pétroliers employaient les vieux puits pour l'entrée des gaz et cherchaient à pratiquer la récupération des autres puits anciens, mais maintenant, la pratique moderne envisage le forage de nouveaux puits dont le type est adapté à la concession particuliére dont il s'agit, et préconise le prélèvement de carottes échantillons du gisement en exploitation. Ces carottes sont soumises à des laboratoires spéciaux pour en faire l'analyse et en examiner la perméabilité, qu'on y détermine en unités de Darcys; on en calcule aussi la porosité en pourcentage d'espace pore aux, et on en mesure la teneur en pétrole, en gaz et en eau avec le plus grand soin. En outre, on en détermine la grosseur du grain, et dans certains cas on étudie même la composition des substances dans la section production.

Après que les tableaux ainsi dressés ont été coordonnés entre eux, il s'agit de déterminer le type et la grandeur de rangées de tubage d'entrée. Il n'est pas recommandable de forcer l'air ou le gaz à pénétrer dans le trou de forage, et d'escompter que la bonne chance voudra que cette injection parvienne jusqu'au gisement qui contient encore du pétrole récupérable. Le pétrole extrait ainsi d'un réservoir d'accumulation quelconque est rarement aspiré uniformément des diverses parties de la formation. Les couches plus perméables ren-

(Continué de Página 214)

mientras por otra parte, se acrecienta la producción, al mismo tiempo. Otra ventaja ofrecida por este tipo individual de equipo de bombaje es el salvamento, en vista del hecho de que el grupo puede ser fácilmente trasladado de un pozo a otro, según las variaciones de la producción, cosa que no puede hacerse en el caso del grupo motor centralizado.

RECOMPRESION

La recompresión de campos petrolíferos parcialmente agotados se ha practica desde hace más de veinticinco años, pero se ha alcanzado un mayor porgreso, en este sentido, durante estos últimos cinco años, que en los veinte anteriores. Entre los nuevos adelantos se hallan el sacar muestras de los yacimientos o formaciones productivos, análisis de las muestras, aplicación de empaquetadura, separación de pozo, empleo de gas y mezclas de aire y gas, mediciones de las cantidades de aire y gas de entrada y salida, control de la producción de aire y gas, electrificación de las concesiones, funcionamiento unificado y utilización de mejor equipo.

En años pasados, los explotadores recurrían a los pozos viejos para el gas de entrada, con el fin de rehabilitar otros pozos viejos, pero la práctica moderna recomienda la perforación de nuevos pozos, de acuerdo con una forma adecuada al lugar, y la obtención de muestras del yacimiento. Estas muestras se llevan a laboratorios especiales, para un estudio detallada, y la permeabilidad, expresada en unidades Darcy, se determina con cuidado. Luego se determinan la porosidad, en porcentaje de espacio de poros, contenido de petróleo y contenido de agua y gas. Se determina también el tamaño del grano, y a veces, se estudia también la composición de los materiales en la sección productiva.

A continuación de la preparación de los soportes, el paso siguiente es determinar el tipo y el tamaño de la tubería de entrada. No se recomienda la práctica de introducir aire o gas en el pozo y confiar en la buena suerte que llegará hasta la formación que todavía contiene petróleo recuperable. El petróleo recuperado de cualquier depósito rara vez es extraido uniformemente de todas las partes del yacimiento o formación. La estrata más permeable cede el petróleo más fácilmente, y cuando llega el momento de aplicar un método de recuperación secundario, el medio de recompresión tiene la tendencia a seguir el paso de menor resistencia, haciendo muy poco trabajo efectivo.

La recompresión moderna requiere la colocación de empaquetadores especiales en la tubería, para separar la estrata en grupos que tengan iguales características de arena y la mayor igualdad posible de saturación. De este modo es posible colocar el tubo en el pozo con una o más hileras de tubería de entrada y aplicar entonces a cada sección de la formación una cantidad y presión de gas adecuada a la extracción del petróleo. Se ha perfeccionado un empaquetador de tipo el completa extensión.

Para la recuperación más efectiva se hacen "cuatro", "cinco" o "siete" perforaciones de forma adecuada, coordinando la posición del punto de extracción con la posición del pozo central de entrada. Las condiciones locales determinan el tipo de separación, pero la distancia entre los pozos puede variar dentro de límites de 150 a 330 pies.

El gas es el medio más conveniente para la recompresión, pero donde no puede emplearse a un costo económico, puede utilizarse el aire con resultados satisfactorios. Las mezclas de aire y gas se ensayan periódicamente, para determinar el porcentaje de aire, el cual nunca debe pasar del 75% del volumen total de la mezcla en circulación.

Se mantiene cuenta constante de los volumenes de entrada, para su comparación con la producción de petróleo correspondiente a la zona

readily and when the time comes to apply some secondary recovery method the repressuring medium has a tendency to follow the path of least resistance and do little effective work.

Modern repressuring requires the placing of special packers on the tubing to separate the strata into groups having the same sand characteristics and as nearly as possible the same saturation. In this manner it is possible to tube the well with one or more input strings and then apply to each section of the formation a volume and pressure of gas suited to extraction of the oil. A new full expanding type packer has been developed.

For the most effective recovery "four," "five" or "seven" spot patterns are adopted, each spot representing the position of the pumping well with relation to the position of the central input well.

Headache post for jack

Local conditions influence the type of spacing, but the distance between wells is usually varied within the limits of 150 to 330 feet.

Gas is the most desirable medium for repressuring but where it is not available at an economic cost, air is being used satisfactorily. The air-gas mixtures are tested periodically for the percentage of air content which should never be more than 75 per cent of the total volume of gas mixture in circulation.

Constant check is kept upon the input volumes and compared with the production of oil for the area which the pressure well serves. The average input ratio may be expressed as

$$\frac{\text{Gas injected to unit area or pattern}}{\text{Oil produced from unit area or pattern}}$$

and in most cases under good operating conditions is between 3,000 and 6,000 cubic feet. In some instances an injection of from 1,000 to 2,000 cubic feet of gas or air-gas mixture, per foot of sand, per day, gives very satisfactory results.

The producing wells are equipped with orifice flanges and periodic tests of flow of gas from these wells are made to determine the oil-gas ratio expressed as

$$\frac{\text{Gas production from well}}{\text{Oil production from well}}$$

and fluid-gas ratio which includes the water and oil in volume in proportion to the gas. Through keeping a check on the two gas-oil ratios it is possi-

(Continued on Page 223)

dront leur pétrole plus facilement que les autres, et lorsque le moment est venu de mettre en jeu une méthode de récupération secondaire, le procédé de rétablissement de la pression a tendance à suivre la voie de moindre résistance et par suite à être assez peu efficace.

Le procédé moderne de rétablissement de la pression demande la pose de garnitures spéciales sur le tubage afin de séparer les couches en groupes dont chacun a les mêmes caractéristiques de sable et un degré de saturation aussi voisin que possible. De cette manière, il est possible de descendre dans le puits une colonne ou plus de tubage d'entrée, puis d'appliquer à chaque section ainsi déterminée du gisement un volume et une pression de gaz appropriés è l'extraction du pétrole dont il s'agit. On a reussi à perfectionner une nouvelle garniture d'un type dit d'expansion maximum.

Afin d'obtenir un rendement maximum de cette extraction, on adopte "quatre," "cinq" ou "sept" échantillons locaux, chacun d'eux représentant la position du puits de pompage par rapport à la position du puits d'entrée central. Selon les conditions particulières de l'endroit, on variera le type d'espacement, mais la distance entre les puits ne varie habituellement que dans les limites de 150 à 330 pieds.

Le gaz est l'agent le plus satisfaisant pour rétablir la pression dans les gisements, mais où on ne peut pas se le procurer économiquement, on peut employer avec succés l'air à cette fin. On analyse périodiquement les mélanges air-gaz afin de déterminer le pourcentage de leur teneur en air, pourcentage qui ne doit jamais dépasser 75 pour cent du volume total du mélange gazeux en circulation.

On vérifie constamment les volumes d'admission, et on les compare avec la production de pétrole pour la superficie que le puits sous pression dessert. On peut écrire le rapport d'admission moyen sous la forme:

$$\frac{\text{Gaz injecté à étendue unitaire ou modéle}}{\text{Pétrole produit de l'étendue unitaire ou modéle}}$$

et, dans la plupart des cas, dans de bonnes conditions d'exploitation, ce rapport se chiffre entre 3000 et 6000 pieds cubes. Dans certains cas, une injection de 1000 à 2000 pieds cubes de gaz ou de mélange air-gaz, par pied de sable, et par jour, donne des résultats très satisfaisants.

Les puits producteurs sont équipés de brides à orifice, et on fait périodiquement des essais de l'écoulement du gaz de ces puits afin de déterminer le rapport pétrole-gaz exprimé par la formule:

$$\frac{\text{Production de gaz du puits}}{\text{Production de pétrole du puits}}$$

et aussi pour déterminer le rapport fluide-gaz qui comprend l'eau et le pétrole sous un volume en rapport avec le gaz. En suivant de près les deux rapports gaz-pétrole, il est possible de repérer les mouvements de gaz dans la formation en exploitation, et ainsi préparer la canalisation ou l'enrayement du gaz avant qu'il ne force une issue.

TRAITEMENT ACIDE

Il est probable que le plus important progrès réalisé récemment dans la technique du traitement acide a été l'introduction dans les puits d'une substance gélatineuse qui permet d'étanchéifier un gisement de formation de grès dans ce puits, de sorte qu'on peut appliquer l'acide à une formation calcaire productrice située au-dessus de la formation de grès. Cette gélatine contient environ 3 pour cent d'une matière organique et 97 pour cent d'eau. Son emploi est indiqué chaque fois qu'on veut empêcher l'acide d'agir sur la base de la formation exploitée, soit parce qu'on craint d'extraire de l'eau, soit parce qu'on croit que des

(Continué sur Page 223)

o área servida por el pozo de presión. La relación promedia del gas de entrada puede expresarse como sigue:

$$\frac{\text{Gas inyectado a la sección tratada}}{\text{Petróleo producido o extraído de la sección tratada}}$$

y en la mayor parte de los casos, bajo buenas condiciones de explotación, la relación es de 3.000 a 6.000 pies cúbicos. En algunos casos, una inyección de 1.000 a 2.000 pies cúbicos de gas o de mezcla de aire y gas, por pie de arena, por día, produce resultados muy satisfactorios.

Los pozos productivos están provistos de orificios especiales y se hacen ensayos periódicos del gas que sale de estos pozos, para determinar la relación entre el petróleo y el gas, expresada así:

$$\frac{\text{Producción de gaz del pozo}}{\text{Producción de petróleo del pozo}}$$

y también para la relación entre el agua y el gas, que comprende al agua y el petróleo en volumen, en proporción al gas. Llevando cuenta de las dos relaciones entre el gas y el petróleo, se hace posible observar el movimiento del gas en la formación y anticipar la canalización o la obturación del gas antes de que se desarrolle con exceso.

TRATAMIENTO ACIDO

Probablemente el progreso más notable realizado últimamente en la técnica del tratamiento ácido, ha sido la introducción, en los pozos, de una substancia gelatinosa, que permite tapar un yacimiento de formación de arena en el pozo, de modo que puede aplicarse ácido a una formación calcárea o de piedra caliza productiva, colocado encima de la formación de arena. Esta gelatina contiene como 3% de una materia orgánica y 97% de agua. Su empleo se recomienda cada vez que se desea evitar que el ácido actúe sobre la base de la formación explotada, debido al temor de extraer agua, o por creerse que las inyecciones precedentes de ácido no hayan todavía atacado suficientemente la sección superior de la formación productiva.

Otro perfeccionamiento realizado ha sido la adición de una substancia al ácido, con el objeto de limpiar la sección superior de la formación productora, para que el contacto entre el ácido y la capa no quede interceptado por los petróleos pesados, que pudieran adherirse a la formación productora. Después que esta asociación se realiza, ella no acelera la acción. Los pozos recientemente tratados de esta manera han tenido períodos de paralización mucho más cortos que antes. Entonces era necesario contar con un promedio de 72 horas, para permitir la acción del ácido, siguiendo el método antiguo. Actualmente, según el procedimiento moderno, no hay necesidad de más de 4 o 5 horas de acción, para obtener los resultados deseados. Debemos, sin embargo, observar que la mayor parte de esta reducción de tiempo no se debe a la adición de la substancia depurante, sino que se produce a causa de nuevas consideraciones, que intervienen en el tratamiento. Se sabe que la acción es, en la mayor parte de los casos, suficientemente rápida para que este corto período de acción produzca el efecto deseado. Los períodos de interrupción o paralización, en la extracción de petróleo, representan, en general, pérdidas para el propietario de los pozos, y se ha comprobado, de una manera irrefutable, que los largos períodos de paralización en la extracción de petróleo tienen consecuencias muy desventajosas. En efecto, es durante estos períodos de paralización cuando las partículas insolubles desprendidas de la cal, por la acción del ácido, tienen la oportunidad de depositarse en los poros, en lugar de ser arrastradas, como sucede en el caso de los pozos que se ponen en producción tan pronto como se termina la acción.

(Continué en Página 223)

Shipping weight 200 lbs. per drawworks

BOXED, DRILLED, READY *for* ACTION!

ELIMINATES SCORING

FORTE FRICTION

ELIMINA QUEMADURA

CUTS OPERATING COSTS

ELIMINER LES SURCHAUFFAGE

HIGH FRICTION

SAFE

MAYOR DURACIÓN DEL TAMBOR

DRUMS LAST LONGER

ALTA FRICCIÓN

BRAKE LINING that lasts TWICE AS LONG

Emsco Engineered lasts longer than other types of brake lining . . . and brake drums, too, last longer. It's a soft acting brake lining that combines two braking actions and combines all the advantages of both woven and moulded linings and has none of the disadvantages of either.

Protected by patents and shipped in boxes ready for quick, simple installation.

UNE GARNITURE DE FREIN qui dure DEUX FOIS PLUS LONGTEMPS

"Emsco Engineered" fait un plus long usage que les autres types de garniture de frein . . . et les tambours de frein, eux aussi, durent plus longtemps. Il s'agit d'une garniture de frein d'action douce qui combine deux actions de freinage et réunit tous les avantages des garnitures tissées et des garnitures moulées, et cela sans en avoir aucun des inconvénients.

Protégée par des brevets et expédiée en caisses, toute prête à être posée rapidement et simplement.

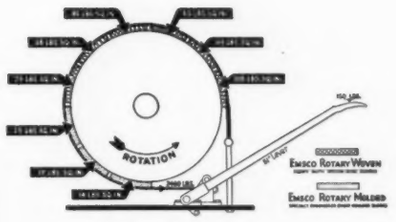
FORRO DE FRENO que dura DOS VECES MAS

El Emsco Engineered dura más que otros tipos de forro de freno, y los tambores de los frenos duran también mucho más. Es un forro de freno de fácil funcionamiento, que ofrece doble acción de enfrenamiento, combinando todas las ventajas de los forros tejidos y moldeados, sin ninguna de sus desventajas.

Protegido por patentes y vendido en cajas, listo para su immediata y fácil instalación.

EMSCO *Engineered* **ROTARY BRAKE LINING SETS**

Emsco Asbestos Company, Downey, Cal., U.S.A.



New in Principle— PROVED in Operation

The above diagram explains the basic principle of Emsco Engineered. Braking pressures vary at different points on the band. Where pressure is lightest a specially engineered combination of Moulded Blocks applies a light abrasive braking action—just enough to keep drums smooth without excessive drum wear. No scoring.

Where the real braking job is done, Emsco Woven segments go into action delivering safer, smoother stops—and more of them.

Cut down the cost of drilling operations with Emsco Engineered Rotary Brake Lining—in sets.

Nouveau par le principe— PROUVÉ en service

Le schéma ci-dessus explique le principe de base de la garniture de frein "Emsco Engineered". Les pressions de freinage varient à divers points de la bande. Oú la pression est la plus légère, une combinaison spécialement étudiée de blocs moulés exerce une légère action abrasive de freinage—juste assez pour maintenir les tambours unis sans usure excessive des tambours. Aucun rayage.

Oú le freinage effectif doit avoir lieu, les segments tissés Emsco entrent en action assurant des arrêts plus doux et plus sûrs—et cela en plus grand nombre.

Réduisez vos frais d'opérations de forage en ayant recours à la garniture de frein rotative "Emsco Engineered"—fournie en jeux.

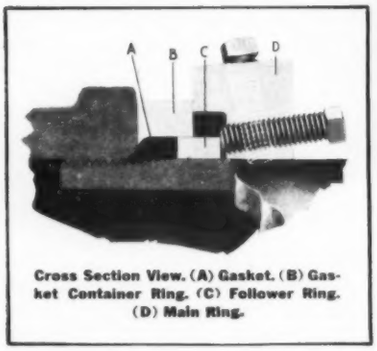
Nuevo en principio— confirmado en la práctica

El diagrama de arriba explica el principio básico del forro de freno Emsco "Engineered". Las presiones de enfrenamiento varían en los diferentes puntos de la banda. Donde la presión es liviana, una combinación de bloques moldeados, especialmente proyectada, aplica una leve acción de enfrenamiento, la cual es suficiente para conservar la suavidad del tambor sin causarle desgaste excesivo. No hay rayadura.

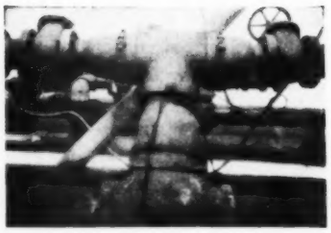
Donde se realiza un verdadero trabajo de enfrenamiento, los segmentos Emsco tejidos entran en acción, asegurando paradas más suaves y efectivas, y en mayor número.

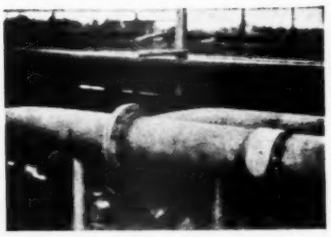
Reduzca el costo del trabajo de perforación con el ferro de freno rotatorio Emsco Engineered, ofrecido en juegos.

SKINNER



Cross Section View. (A) Gasket. (B) Gasket Container Ring. (C) Follower Ring. (D) Main Ring.





A standard pipe joint repair the world over—in Refineries, at Well Heads, and Christmas Trees

PIPE JOINT CLAMP

● For stopping any Thread Leak at tee, elbow, flange, gate coupling or master gate under any pressure or temperature

THE ONLY JOINT CLAMP IN UNIVERSAL USE—THE WORLD OVER! Easily applied under pressure, by one man. No interruption of service. Saves the cost of tearing out and renewing leaky joints, and prevents shutdowns. Because of their absolute dependability and permanence, Skinner Pipe Joint Clamps are standard equipment for oil field, pipe line, and refinery. Thousands used yearly on pressures up to 1385 lbs.

Guaranteed safe, positive, permanent under any pressure or operating condition. Rubber gasket is forced directly into the threads, and SEALED there, stopping the leak at its source. Clamps are made of malleable iron, heavily enamelled; with cadmium plated steel bolts. Packed complete with gasket and full illustrated directions.

LE SEUL SERRE-JOINT D'USAGE UNIVERSEL—DANS LE MONDE ENTIER! Facile à poser sous pression, un seul homme suffit. Aucune interruption de service. Epargne les frais d'arrachage et de remplacement des joints ayant des fuites, et ainsi prévient les temps d'arrêt. A cause de leur service irréprochable et de leur permanence rigoureuse, les serre-joints de tuyaux Skinner sont admis comme équipement standard pour les champs de pétrole, les pipe-lines et les raffineries. Il en est employé chaque année des milliers qui supportent des pressions allant jusqu'à 1385 lbs.

Garanti sûr, positif et permanent sous toute pression et dans toute condition de service. Un joint en caoutchouc est enfoncé directement dans les filets, et y est SCELLÉ, ce qui arrête la fuite à sa source même. Les serre-joints sont en fer malléable, fortement émaillé; avec boulons en acier plaqué au cadmium. Emballés au complet avec joint et mode d'emploi détaillé et illustré.

LA UNICA ABRAZADERA DE UNION DE USO UNIVERSAL—EN TODO EL MUNDO. Fácil de colocar bajo presión, con la ayuda de un solo operario. Ninguna interrupción de servicio. Ahorra el gasto de quitar y de reemplazar la unión con escape y evita así la paralización del trabajo. A causa de su servicio irreprochable e invariable estabilidad, estas abrazaderas de unión de tubería Skinner se aceptan hoy día, en todas partes, como el equipo normal, para campos petrolíferos, sistemas de oleaductos y refinerías. Se usan annualmente millares de estas abrazaderas, que soportan hasta 1385 labras de presion. Se garantizan que son seguras, positivas y permananentes bajo toda presión y en toda condición de servicio. Una empaquetadura de caucho se embute directamente en las roscas, quedando aquí bien CERRADA, para tapar el escape en su misma fuente. Estas abrazaderas de unión se hacen de hierro maleable y llevan gruesa capa de esmalte, con pernos de acero con enchape de cadmio. Se suministran completas, incluyendo empaquetadura e instrucciones ilustradas para su empleo.

SKINNER EMERGENCY PIPE CLAMP

For stopping leaks in pipe lines, instantly, permanently. Quickly, easily applied, anywhere. Pipe sizes ½ to 12". Standard in petroleum industry for nearly 40 years.

Pour arrêter instantanément et définitivement les fuites de pipe-lines. Application facile et rapide n'importe où. Calibres de tuyaux de ½ à 12 pouces. Standard dans l'industrie du pétrole depuis près de 40 ans.

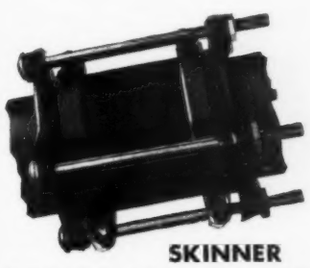
Para tapar instantáneamente y de un modo permanente los escapes en los sistemas de tubería. Aplicación rápida y fácil en todo punto y lugar. Para tubos de diámetro de ½ a 12 pulgadas. La norma en toda la industria del petróleo desde hace más de 40 años.

SKINNER PIPE LINE CLAMP

For repairing long splits or very bad corrosion in pipe lines. Tremendously strong —suitable for highest pressures.

Pour réparer les longues fissures ou la corrosion avancée sur les pipe-lines. Extra-robustes—convenant aux plus hautes pressions.

Para reparar las trizaduras o roturas largas y para reparar la corrosión bien avanzada de los sistemas de tubería. Sumamente firmes y convenientes a las más altas presiones.



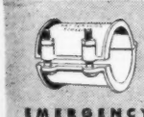
SKINNER COLLAR LEAK CLAMP

For stopping every type of collar leak, regardless of kind of collar used, or condition of line. Rough, tapered, or uneven collars easily clamped.

Pour arrêter tout genre de fuite de collier, quel que soit le type de collier employé ou l'état de la conduite. Facile à monter même sur des colliers rugueux, ovalisés ou irréguliers.

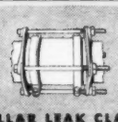
Para tapar toda clase de escape por el collar, no importa de qué tipo sea y sin relación al estado del conducto. Puede también aplicarse sin dificultad a los collares arrugados, ovalados o de otras formas irregulares.

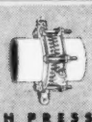
M. B. SKINNER CO. *Est. 1898* SOUTH BEND, IND.


EMERGENCY PIPE CLAMP

PIPE LINE CLAMP

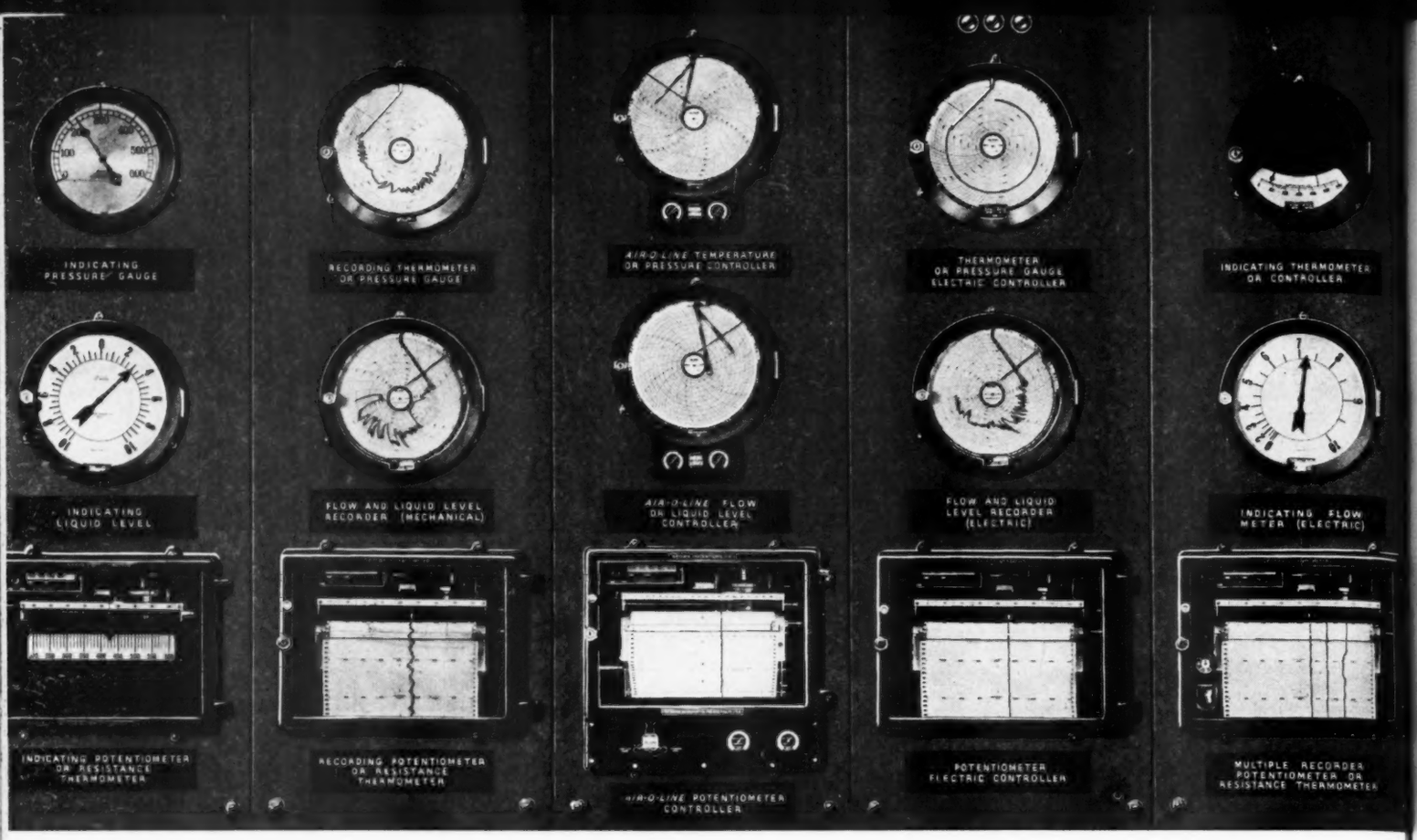
PIPE JOINT CLAMP


COLLAR LEAK CLAMP


HIGH PRESSURE WELD CLAMP

BELL JOINT CLAMP

PRESSED STEEL ECONOMY CLAMP


INDICATING PRESSURE GAUGE
RECORDING THERMOMETER OR PRESSURE GAUGE
AIR-O-LINE TEMPERATURE OR PRESSURE CONTROLLER
THERMOMETER OR PRESSURE GAUGE ELECTRIC CONTROLLER
INDICATING THERMOMETER OR CONTROLLER
INDICATING LIQUID LEVEL
FLOW AND LIQUID LEVEL RECORDER (MECHANICAL)
AIR-O-LINE FLOW OR LIQUID LEVEL CONTROLLER
FLOW AND LIQUID LEVEL RECORDER (ELECTRIC)
INDICATING FLOW METER (ELECTRIC)
INDICATING POTENTIOMETER OR RESISTANCE THERMOMETER
RECORDING POTENTIOMETER OR RESISTANCE THERMOMETER
AIR-O-LINE POTENTIOMETER CONTROLLER
POTENTIOMETER ELECTRIC CONTROLLER
MULTIPLE RECORDER POTENTIOMETER OR RESISTANCE THERMOMETER

Ils *ameliorent* Le Rendement Du Raffinage Des Petroles

Grâce à eux, vous maintiendrez l'équilibre dans vos traitements continus—vous assurant la continuité du débit, des coupages plus précis, des octanes de série plus élevée et des rendements maxima à moins de frais.

Vous pouvez vous reposer entièrement sur la précision et la régularité de fonctionnement des instruments de raffinerie Brown dans la conduite des installations de distillation—des groupes de cracking—des ateliers de récupération de vapeurs—des ateliers à traitements acides—des ateliers de polimérisation—des ateliers d'hydrogénation—des groupes à traitement de résidus—des ateliers de traitement par solvants—des ateliers d'extraction de cires et des ateliers d'absorption d'essence.

Partout où on les installe—les rendements sont accrus, car ils assurent une mesure plus précise et un contrôle plus positif des températures, des pressions, des écoulements et des niveaux de liquides.

Les instruments indicateurs et enregistreurs Brown peuvent être montés sur panneaux individuels ou groupés sur un tableau de distribution central. Logés dans des étuis universels standard, adaptables à tout style de montage de panneau, ils ont un aspect uniforme et bien équilibré. Nos ingénieurs sont à votre entière disposition pour vous recommander les instruments les plus économiques répondant aux besoins de votre fabrique.

PYROMETRES POTENTIOMETRES
Pour indiquer, enregistrer et contrôler les températures dans les alambics, les colonnes, les fours, les cheminées, les conduites, etc. Catalogue No. 1101.

COMPTEURS D'ECOULEMENT
Pour indiquer, enregistrer et contrôler l'écoulement d'essence, gaz, vapeur, air et autres liquides, gaz ou vapeurs. Catalogue No. 2004.

COMPTEURS DE CO^2
Pour indiquer, enregistrer et contrôler le % de CO^2 dans le foyer d'alambic et de chaudière pour contrôler et assurer une chauffe d'efficacité impeccable. Catalogue No. 3004.

CONTROLES AUTOMATIQUES
Pour contrôler automatiquement, dans les limites désirées, les températures, les pressions, les écoulements, les niveaux dans les colonnes; commande électrique ou pneumatique. Catalogue No. 8901.

THERMOMETRES
Pour indiquer, enregistrer et contrôler les températures jusqu'à 1200° F. Catalogue No. 6703.

MANOMETRES ET VACUOMETRES
Pour indiquer, enregistrer et contrôler les pressions et les vides dans les alambics, les colonnes, les groupes de force et de vapeur. etc. Catalogue No. 6703.

INDICATEURS DE NIVEAUX POUR LIQUIDES
Pour indiquer, enregistrer et contrôler le niveau du pétrole et des produits pétroliers liquides dans les réservoirs, les colonnes, etc., à distance. Catalogue No. 6703.

THERMOMETRES TYPE RESISTANCE
Pour indiquer, enregistrer et contrôler les basses températures telles qu'on les rencontre dans les installations d'extraction des cires. Catalogue No. 9001.

Pour catalogues et renseignements, écrire à: The Brown Instrument Co., *une* division de la Minneapolis-Honeywell Regulator Company, 4488 Wayne Avenue, Philadelphie, Pa. Usine canadienne: 117 Peter St., Toronto, Canada. Succursales dans toutes les principales villes.

Adresse en Europe: N.V.N. Minneapolis-Honeywell Co., Wydesteeg 4, Amsterdam-C, Hollande.

Imparten mayor Rendimiento A La Refinacion Del Petroleo

Gracias a estos aparatos, Uds. mantendrán el equilibrio en sus tratamientos contínuos, asegurándose de la continuidad del trabajo, de cortes más precisos, de octanos de serie más elevada ye de rendimientos máximos a menores gastos.

Uds. pueden tener completa confianza sobre le precisión y la regularidad de funcionamiento de estos instrumentos de refinería Brown en la conducción de instalaciones de destilación, extracción por el procedimiento "cracking", plantas de recuperación de vapores, plantas de tratamiento de ácidos, plantas de polimerisación, plantas de hidrogenación, plantas de tratamiento de resíduos, plantas de tratamiento por disolventes, plantas de extracción de ceras y plantas de absorción de gasolina.

En todo lugar donde se instalan, se ha aumentado el rendimiento notablemente, a causa de que aseguran una medida más precisa y un control más positivo de las temperaturas, de las presiones, de los flujos y de los niveles de los líquidos.

Los instrumentos indicadores y registradores Brown pueden montarse en paneles individuales o en grupos sobre un tablero de distribución central. Alojados en estuches universales standard, adaptables a todo estilo de montaje de panel, presentan un aspecto uniforme, bien equilibrado y muy agradable a la vista. Nuestros ingenieros están a su completa disposición para recomendarle los instrumentos que respondan más económicamente a las necesidades de su establecimiento.

PIROMETROS POTENCIOMETROS
Para indicar, registrar y controlar las temperaturas de los alambiques, torres, hornos, chimeneas, conductos, etc. Se describen en nuestro catálogo No. 1101.

CONTADORES DE FLUJO
Para indicar, registrar y controlar el flujo de gasolina, gas, vapor, aire y otros líquidos, gases o vapores. Se describen en nuestro catálogo No. 2004.

CONTADORES DE CO^2
Para indicar, registrar y controlar el % de CO^2 en los hogares de los alambiques y calderas, a fin de regular y asegurar un calentamiento de máxima eficacia. Se describen en nuestro catálogo No. 3004.

CONTROLES AUTOMATICOS
Para controlar automáticamente, dentro de los límites deseados, las temperaturas, las presiones, los flujos, los niveles en las torres; funcionamiento eléctrico o neumático. Se describen en nuestro catálogo No. 8901.

TERMOMETROS
Para indicar, registrar y controlar las temperaturas, hasta un máximo de 1200° F. Se describen en nuestro catálogo No. 6703.

MANOMETROS Y VACUOMETROS
Para indicar, registrar y controlar las presiones y los vacíos en los alambiques, torres, máquinas de vapor, centrales de fuerza, etc. Se describen en nuestro catálogo No. 6703.

INDICADORES DE NIVEL PARA LIQUIDOS
Para indicar, registrar y controlar el nivel del petróleo y los productos petrolíferos líquidos en tanques o depósitos, en torres, etc., a distancia. Se describen en nuestro catálogo No. 6703.

TERMOMETROS, TIPO DE RESISTENCIA
Para indicar, registrar y controlar las temperaturas bajas, como las que se presentan en las instalaciones de extracción de ceras. Se describen en nuestro catálogo No. 9001.

Para catálogos e información, sírvase escribir a: The Brown Instrument Co., *una división* de la Minneapolis-Honeywell Regulator Company, 4488 Wayne Avenue, Filadelfia, Pa., E.U.A. Fábrica en el Canadá: 117 Peter St., Toronto, Canadá. Sucursales en las principales ciudades.

Dirección en Europa: N.V.N. Mineapolis-Honeywell Co., Wydesteeg 4, Amsterdam-C, Holanda.

BROWN INSTRUMENTS
AND
MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS

RECORDING .... INDICATING .... ELECTRIC AND AIR OPERATED CONTROLLERS

To Measure and Control is to Economize

(Continued from Page 218)

ble to note the gas movements in the formation and anticipate channeling or short circuiting of the gas before it gains headway.

ACIDIZING

Probably the most important recent development in acid-treating technique is the introduction of a gelatinous substance which makes it possible to seal off a sandstone pay in a well so that acid can be applied to a productive limestone occurring above the sandstone. The jelly is made up of about 3 per cent of an organic material and 97 per cent water. It is of value whenever it is desired to keep the acid from acting on the bottom of the pay, either because of fear of bringing in water or because of the belief that former acid shots have not attacked the top of the pay sufficiently.

Another improvement is the addition of a substance to the acid for the purpose of cleaning the face of the pay so that the contact between the acid and the pay will not be prevented by heavy oil which may be adhering to the pay. It does not speed the action after the association is accomplished. Wells treated recently are generally being shut in for a shorter period than has been the custom in the past. Whereas 72 hours often was allowed for the reaction in the early use of acid, only 4 or 5 hours are usually allowed at present. Most of this reduction time, however, is not due to the addition of the cleaning substance, but is the result of new considerations entering into the treatment. The action is known to be sufficiently rapid in most cases so that the short period is all that is required. Shutdown time usually represents a loss to the well owner, and it has been established quite definitely that there is a disadvantage in long shut-down periods, since insoluble particles freed from the lime by the acid have time to settle in the pores, instead of being carried out as is the case when the well is put on production immediately after the action is complete.

Since the introduction of acid treating on a large scale, a very noticeable change has been the increase in the size of the shots used. Ordinary shots at present range from 2,000 to 8,000 gallons, whereas at one time 500 gallons was a large shot.

The economic value of acid treatment cannot be shown better than by the manner in which it has developed in a period of 5 years from experimental work in a few fields to a practice as general as the occurrence of limestone reservoirs. Recently many outlaying fields have been provided with well-treating stations and equipment, and one company alone now has 114 acid-treating units in use in the United States. The recent formation of Dowell Sociedad Anonima, a subsidiary of Dow Chemical Co., with headquarters at Mexico City, and with a treating station at Tampico, represents increasing use of acid in wells.

Unlike other methods of secondary recovery, acid treatment has now reached a point in most fields where results can be predicted within reasonable limits. This is a distinct advantage, since a person wishing to recommend an acid treatment for a certain well is able to show data from past treatments which will generally show quite definitely whether or not the treatment will be profitable.

WATER FLOODING

All old holes are plugged and the lease redrilled in accordance with the "four," "five" or "seven" spot plan and as the input water wells are drilled the formation is cored and the cores sent to laboratories for study.

Cores are analyzed for porosity, permeability and saturation and logs made of each section penetrated are correlated and the stratigraphy of the

(Continued on Page 226)

(Continué de Page 218)

injections précédentes d'acide n'ont pas attaqué suffisamment le dessus de la formation payante.

Un autre perfectionnement réalisé a été l'addition d'une substance à l'acide dans le but de nettoyer le dessus de la formation productrice, et cela afin que le contact entre l'acide et la couche payante ne soit pas intercepté par des pétroles lourds qui pourraient adhérer à la formation productrice. Après que cette association est réalisée, elle n'accélère pas l'action. Les puits récemment traités de cette façon ont connu des temps d'arrêt plus courts que ce n'était en général le cas dans le passé. Alors qu'on devait compter en moyenne 72 heures pour laisser l'acide agir selon l'usage précédent, on n'a plus guère besoin maintenant que de 4 à 5 heures d'action pour obtenir les résultats désirés. Notons, toutefois, que la majeure partie de cette réduction de temps ne revient pas à l'addition de la substance décapante, mais est due à de nouvelles considérations qui sont intervenues dans le traitement. On sait que l'action est dans la plupart des cas suffisamment rapide pour que cette courte pèriode d'action produise l'effet désiré. Les temps d'arrêt dans l'exploitation représentent en général des partes pour le propriétaire des puits, et on a prouvé d'une manière irréfutable que les longues périodes d'arrêt dans l'extraction du pétrole ont des conséquences nettement regrettables; en effet, c'est pendant ces périodes que les particules insolubles libérées de la chaux par l'acide ont le temps de se déposer dans les pores, au lieu d'être entraînées comme dans le cas où on met le puits en production tout de suite après que l'action est terminée.

Depuis qu'on a appliqué le traitement acide sur une grande échelle, un changement très notable est survenu sous la forme d'augmentation du volume des injections faites. Les injections couramments faites à l'heure actuelle sont de 2000 à 8000 gallons, alors qu'autrefois une injection de 500 gallons était considérée importante.

L'intérêt économique du traitement acide ne peut pas être prouvé d'une manière plus convaincante que par la manière avec laquelle il a évolué au cours de la dernière période de 5 ans, d'abord sur une échelle purement expérimentale dans quelques chantiers pour devenir tout récemment une pratique généralisée aussi courante que la fréquence des gisements de formations calcaires. Tout récemment, de nombreux champs pétroliers de bordure ont été pourvus de stations et de matériel de traitement des puits, et on cite le cas d'une compagnie qui possède déjà 114 unités à traitement acide en service aux Etats-Unis. La récente constitution de la Dowell Sociedad Anonima, une filiale de la Dow Chemical Co., avec siège social à Mexico et une station de traitement à Tampico, met en évidence l'emploi croissant du traitement acide dans les puits pétroliers.

A la différence des autres méthodes d'extraction secondaire, on peut dire que le traitement acide a d'ores et déjà atteint dans la plupart des chantiers un point où on peut prédire les résultats avec un certain degrè de certitude. C'est là un avantage décisif, puisqu'une personne désireuse de recommander un traitement acide pour un certain puits est à même de présenter des données provenant de traitements passés grâce auxquelles on pourra déterminer avec certitude si l'on peut appliquer le traitement avec profit ou non dans le cas considéré.

NOYAGE A L'EAU

On bouche tout d'abord tous les anciens puits, ensuite on refore le terrain de la concession selon le plan à "quatre," "cinq" ou "sept" points, et pendant qu'on fore les puits d'admission d'eau, on fait le prélèvement de carrotes ou échantillons dans la formation, et on envoie ces carottes aux laboratoires pour qu'on les y analyse.

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Desde la introducción del tratamiento con ácido en grande escala, se ha presenciado un cambio muy notable en el aumento del volumen de las inyecciones hechas. Las inyecciones que se hacen corrientemente hoy día son de 2.000 a 8.000 galones, mientras que antes, una inyección de 500 galones se consideraba como una bien grande.

El valor económico del tratamiento ácido no puede ser demostrado de una manera más convincente que por la forma tan rápida en que se ha desarrollado durante estos cino últimos años. Empezó en muy pqueña escala, como un procedimiento puramente experimental, en unos pocos campos, y se ha hecho, últimamente, una práctica tan corriente como la frecuencia de los yacimientos de formación calcárea. Ultimamente, varios campos petroleros han sido provistos de estaciones y de materiales de tratamiento de pozos, y se cita el caso de una compañia que tiene ya 114 instalaciones de tratamiento de ácido en funcionamiento en los Estados Unidos. La reciente institución de la Dowell Sociedad Anónima, una filial de la Dow Chemical Co., con asiento social en la ciudad de México, y con una estación de tratamiento en Tampico, pone de evidencia el empleo creciente del tratamiento ácido en pozos petroleros.

A diferencia de otros métodos de extracción secundaria, se puede decir que el tratamiento ácido ha llegado ya, en la mayor parte de los casos, a un punto en que se puede predecir el resultado con un cierto grado de certidumbre. Esta es una ventaja decisiva, a causa de que una persona deseosa de recomendar un tratamiento ácido para un cierto pozo, puede entonces presentar datos relativos a tratamientos pasados, pudiendo, en virtud de ellos, determinar con certeza, si se puede o no aplicar el tratamiento, sobre una base ventajosa, en el caso bajo consideración.

INUNDACION CON AGUA

Después de tapar todos los agujeros antiguos, el yacimiento se perfora de nuevo, de acuerdo con el plan de "cuatro", "cinco" o "siete" puntos, y mientras se perforan los pozos de agua de entrada, se sacan muestras de la formación, las cuales se envian a laboratorios. para su ensayo.

Los muestras se someten a análises de porosidad, permeabilidad y saturación y los trozos sacados de cada sección penetrada se correlacionan. Con la estratigrafía de la formación productiva cuidadosamente estudiada, resulta factible calcular de antemano, antes de la inundación, la cantidad y presión aproximada del agua que se necesitará para extraer el aceite de los poros y las características de la arena. Esto, por supuesto, permite darse cuenta del costo aproximado de la preparación del trabajo de inundación con agua, pues con semejante información se puede calcular el equipo de bomba y el sistema de agua que requiere para la obra.

Ninguna extensión de arena es uniforme, pues contiene partes con más petróleo que otras, y como el grado de permeabilidad varía de una sección a otra, resulta generalmente conveniente emplear obturadores entre las secciones de arena.

Se han perfeccionado obturadores especiales, a través de los cuales se puede pasar dos o más tuberías, de longitudes adecuadas, que permiten la aplicación de un diferente volumen y presión de agua, a cada sección, de acuerdo con las características de cada sección.

Al aplicar inundación con agua a un yacimiento viejo, es generalmente necesario desarrollar una gradual presión contra el cuerpo de arena, para compensar la acumulación del petróleo desplazado y ofrecer mayor resistencia a las fuerzas aplicadas a empujar el petróleo hacia los pozos de salida. Cuando la impulsión por agua se efectúa en de-

(Continué en Página 226)

Not "One for All", but "*Tailor-Made*" Rock Bits—Hughes Tool Company's answer to best meet today's unusual drilling problems.

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Aucun outil n'a joué un rôle plus important dans le succès et la réalisation d'économies en forage rotatif que le trépan à roc Hughes.

Dans la majorité des champs pétrolifères du monde soumis au forage rotatif—et où le forage au trépan à roc s'impose—on donne la préférence aux trépans à roc Hughes à cause de leur rendement supérieur.

Aujourd'hui, chaque trépan à roc "Tri-Cone" Hughes est étudié spécialement pour une formation, une pression de forage et une vitesse de rotation bien définies — une innovation en construction de trépans à roc qui assure une progression maximum, une plus grande vitesse, et réduit au minimum les frais des montées et descentes.

Un quart de siècle de records mondiaux en forage dur vous prouve que vous avez intérêt à recourir aux trépans Hughes pour vos opérations de forage en formations dures. Demandez-nous notre catalogue complet sur les trépans à roc et autre matériel spécialisé Hughes pour exploitation pétrolière.

"BUENOS SOLDADOS BAJO TODA BANDERA"

Ninguna otra herramienta ha desempeñado un papel más importante en el éxito y en la realización de economiás en la perforación rotativa, que la barrena para roca Hughes.

En la mayor parte de los campos petrolíferos del mundo, sometidos a perforación rotativa, o donde se impone el uso de barrena para roca para la perforación, se da la preferencia a las barrenas para roca Hughes, a causa de su rendimiento tan superior.

Hoy día, cada barrena para roca "Tri-Cone" Hughes se estudia especialmente para una formación, una presión de perforación y una velocidad de rotación bien definidas, lo que constituye una gran innovación en la construcción de barrenas para roca, pues asegura un rendimiento progresivo máximo, una mayor rapidez, con un gasto de manejo general reducido a un mínimo.

Un cuarto de siglo de supremacía internacional es garantía de que todos los interesados pueden confiar incondicionalmente en las barrenas Hughes para la perforación de cualquier formación dura. Sírvase pedirnos nuestro catálogo general de barrenas para roca y de otros productos Hughes especiales para la explotación de pozos de petróleo.

HUGHES TOOL COMPANY

HOUSTON, TEXAS - U. S. A.

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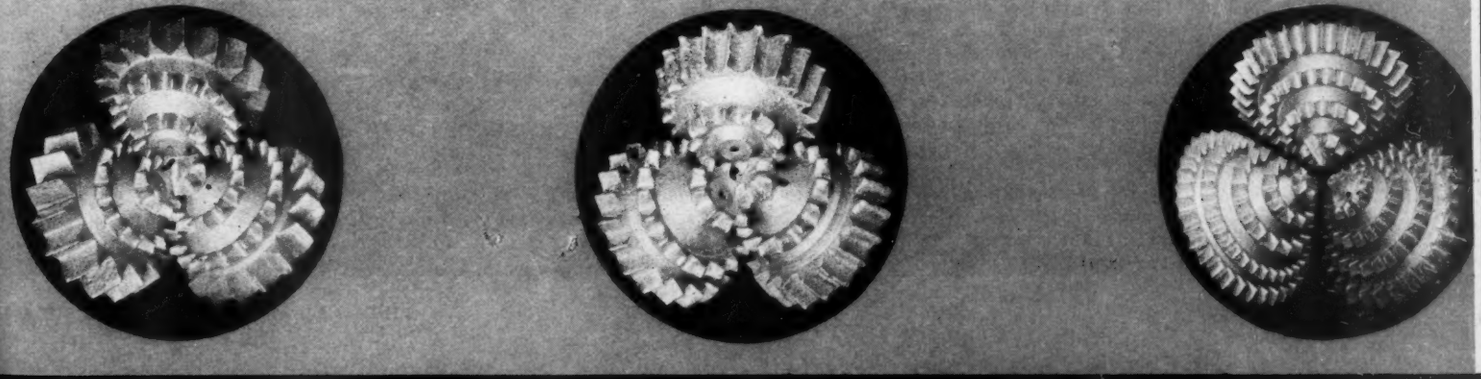

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producing formation developed so it is possible to calculate in advance of flooding the approximate volume and pressure of water needed to drive the oil out of the pores and sand characteristic determined. This allows the operator to know something of the cost of preparing a lease for water flooding because the pumping equipment and water system required can then be estimated.

No sand body is uniform but contain sand lenses with more oil than others, and the degree of permeability will vary from section to section so it may be desirable to use packers between the sand sections.

Special packers have been developed through which it is possible to run two or more strings of tubing, selected for length to allow a different volume and pressure of water to be applied to each section to suit that section's characteristics.

In applying water-flood to an old field it is usually necessary to gradually build up pressure against the face of the sand to compensate for accumulation of oil displaced and offering more resistance to the forces applied to drive the oil toward the output wells. If the water drive is properly conducted this wall of water will move almost vertically through the formation and will remove from 40 to 50 per cent of the oil. This oil is not all removed at once but a large percentage does tend to accumulate during the first period of the water drive so the production curve for a lease will have a very sharp untrend soon after the flood starts which will break sharply after the first oil reaches the output wells and gradually taper off toward a flat line representing final recovery.

This characteristic of water-flooding is one of its advantages as it permits early returns of capital invested in preparing for the operation and allows the remaining oil to be recovered more slowly, extending the period of income earning. After the peak of production the volume and pressure of water needed is materially reduced, in keeping with the later decline in oil recovery. But if the operation is not properly controlled appreciable volumes of recoverable oil can be trapped behind the water, a total loss or oil to be recovered only at extra expense.

Modern water-flooding operations are usually divided into two parts, first drilling of the water input wells and equipping them before the flood water is turned into them and the later drilling of the oil recovery wells usually not drilled until the flood is well under way. This delayed drilling of the oil wells is desirable because each oil well is drilled in the center of a "pattern,' or group of water input wells, and if this central area is undisturbed until the water has had opportunity to build up the wall of oil ahead of it the control of the later operations will be more assured. If water input and oil recovery wells were all drilled at one time an area of low-pressure would be set up around the oil well tending to unbalance the force applied to drive the oil out of the sand and water might channel across to the oil well or the oil might move in an uneven manner through the sand and permit some water to push ahead of it.

Water for flooding operations must be carefully selected and it is common practice to treat the water. The most desirable water should have as near a neutral pH value as possible. This water will not carry any appreciable volume of solids which might be precipitated in the pores of the sand through chemical reactions when the flood and formation waters comingle. On the other hand this water is not so apt to take into solution out of the formation appreciable volumes of solids which might be dropped in other pore spaces before the water was removed from the output well along with the oil.

Flood water will in time be recycled but if it is of neutral pH value when it enters the formation it is not difficult to precipitate any salts or soluble

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Les carottes sont analysées pour la porosité, la perméabilité et la saturation, et l'on dresse alors des tableaux d'étude de chaque section pénétrée qu'on coordonne soigneusement; on met aussi au point la stratigraphie ou structure des couches de la formation productrice afin de pouvoir déterminer à l'avance, avant le noyage envisagé, le volume et la pression approchés d'eau qu'il faudra employer pour faire sortir le pétrole des pores; enfin, on détermine la caractéristique des sables. Ceci permet à l'exploitant de se faire une idée des frais qu'entraînera le noyage à l'eau du terrain de la concession, car on peut après ces calculs établir un devis du matériel de pompage et du système hydraulique nécessaires.

Il n'existe pas de masse sableuse de texture uniforme, et l'on y trouve toujours des "loupes" de sable contenant plus de pétrole que d'autres; en outre, le degré de perméabilité varie d'une section à une autre, de sorte qu'il peut être désirable de poser des bourrages entre les différentes sections de sable.

On a réalisé des bourrages d'un type spécial à travers lesquels on peut faire passer deux faisceaux ou plus de tubage, de longueur sélectionnée de telle façon qu'un volume et une pression d'eau différents peuvent être appliqués à chaque section en rapport avec les caractéristiques de telle ou telle section.

Lorsqu'on applique le noyage à l'eau à un ancien champ pétrolier, il est habituellement nécessaire d'augmenter graduellement la pression contre la surface du sable afin de compenser l'accumulation du pétrole déplacé et d'offrir une plus grande résistance aux forces appliquées pour chasser le pétrole vers les puits d'extraction. Si cette chasse par l'eau est conduite correctement, ce mur d'eau se déplacera presque verticalement à travers le gisement ou formation et déplacera avec lui de 40 à 50 pour cent de pétrole. Ce pétrole n'est pas déplacé d'un seul coup, mais un fort pourcentage tend à s'accumuler au cours de la première période de la chasse par l'eau, de sorte que la courbe de production d'une concession pétrolière fera ressortir une inclinaison très forte tout de suite après qu'on aura "noyé" la concession, courbe qui diminuera ensuite brusquement sa pente après que les premiers pétroles auront atteint les puits d'extraction, et finira par se rapprocher graduellement de l'horizontale représentant le rendement final de l'extraction.

Cet aspect du noyage à l'eau est un de ses avantages, car il permet des profits à brève échéance sur les capitaux engagés dans la préparation de l'opération, et permet de recueillir le pétrole qui reste plus lentement, ce qui prolonge la période rémunératrice de l'exploitation. Après que le point culminant de la production a été dépassé, le volume et la pression d'eau nécessaires sont beaucoup moindres, en rapport avec le déclin ultérieur de l'extraction pétrolière. Mais si on ne conduit pas l'opération comme il convient, des volumes appréciables de pétrole recouvrable risquent de se traper derrière l'eau, entraînant une perte totale de pétrole ou demandant une extraction coûteuse de ces nappes trapées.

Les opérations modernes de noyage à l'eau des champs pétrolifères se divisent en deux parties, tout d'abord on fore les puits d'entrée de l'eau et on les aménage avant d'y faire pénétrer l'eau de noyage, en second lieu on fore les puits destinés à recueillir le pétrole, ce dernier forage n'étant en général commencé que lorsque l'opération du noyage est déjà bien amorcé. Ce forage retardé des puits pétrolifères est recommandable par suite du fait que chaque puit à pétrole est foré au centre d'un "groupe modèle" ou ensemble de puits d'entrée d'eau, et si la partie centrale n'est pas dérangée jusqu'à ce que l'eau ait eu le temps nécessaire pour former devant elle le mur de pétrole, le contrôle des opérations ultérieures en sera grandement facilité. Si on forait les puits d'entrée d'eau et

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bida forma, esta pared de agua se moverá casi verticalmente por la formación, quitando, en su curso, del 40 al 50% del petróleo. Este petróleo no se quita todo al mismo tiempo, sino que un gran porcentaje tiende a acumularse durante el primer período de la impulsión por agua, de modo que la curva de producción, correspondiente al punto tratado, mostrará, una rápida súbida, a continuación del comienzo de la inundación, para bajar considerablemente después de que el primer petróleo ha llegado a los pozos de salida, continuando en gradual descenso hasta llegar a una línea mínima, que representa la recuperación final.

Esta característica de la inundación con agua es precisamente una de sus ventajas, a causa de que permite obtener inmediatas ganancias sobre el capital invertido en la preparación del trabajo. Por otra parte, permite que el resto del petróleo se recobre más lentamente, lo que extiende el período de ganancia. A continuación del punto culminante de la producción, el volúmen y presión del agua que se necesita, se reduce considerablemente, en armonía con la descendente recuperación de petróleo. Sin embargo, cuando el trabajo no se regula en debida forma, se presenta la posibilidad de que una considerable cantidad de petróleo recuperable pueda quedar retenido detrás del cuerpo de agua, representando una périda, o una adicional extracción a costo adicional.

Los modernos trabajos de inundación o anegación con agua se dividen generalmente en dos partes: la primera es la perforación de los pozos de entrada y su correcto equipo antes de la introducción del agua, y la segunda, la perforación de los pozos de recuperación o producción de petróleo, cosa que se hace más tarde, después de que haya empezado la inundación. Esta perforación retardada de los pozos de petróleo es conveniente a causa de que cada uno de ellos se perforada en el centro de un grupo de pozos de agua de entrada. Cuando esta zona o área central no se perturba hasta que el agua haya tenido la oportunidad de desarrollar una pared de petróleo al frente de ella, el trabajo subsiguiente de extracción resulta más seguro. Si los pozos de entrada de agua y los pozos de recuperación o extracción de aceite se perforaran al mismo tiempo, se establecería una área de baja presión alrededor del pozo de petróleo, con tendencia a desequilibrar la fuerza aplicada a la extracción del petróleo de la arena y posiblemente el agua formaría canalización a través del pozo de petróleo, o bien, el petróleo podría desplazarse de un modo desigual por la arena y permitir que en su sección delantera se formara una acumulación de agua.

El agua para trabajos de inundación debe alegirse con cuidado y se sigue generalmente la práctica de tratar esta agua. El agua más conveniente debe tener el mayor grado posible de valor neutro pH. Esta agua no podrá entonces llevar ninguna cantidad apreciable de substancias sólidas, que pudieran precipitarse en los poros de la arena, mediante reacciones químicas al momento de mezclarse el agua de inundación con el agua de la formación misma. Por otra parte, esta agua preparada no queda muy propensa a formar soluciones con considerables cantidades de substancias sólidas provenientes de la formación, que pudieran alojarse en otros espaciosos porosos, antes de extraerse al agua conjuntamente con el petróleo, por el pozo de salida.

El agua empleada en la inundación tendrá que tratarse de nuevo, después de algún tiempo, pero si tiene un buen valor neutro pH cuando entra en la formación, no es entonces difícil precipitar las sales y otros elementos solubles que se presenten en su curso, al pasar por la formación. De este modo, el agua puede conservarse en condición uniforme.

Se ha dado estudio a la introducción de agua con características seleccionadas, a fin de poder controlar bien la tensión interfacial y lavar, de un modo más efectivo, la película de petróleo de

(Continué en Página 230)

IDEAL
"Reg. U. S. Pat. Off."

No. FE-27½-B
ROTARY MACHINE

An extra heavy, fully enclosed Unit Type Rotary machine with a rated drilling depth of 10,000 feet. Modern design and construction have been combined to produce an extremely smooth and true running machine. Generous use of alloy steel throughout this rotary assures safe and efficient operation under the most severe drilling conditions. Abundant lubrication is furnished from two reservoirs, one for lubricating the table bearing and one to lubricate the level gears. Each reservoir has a capacity of five gallons. Gross Weight prepared for Export 12,975 pounds.

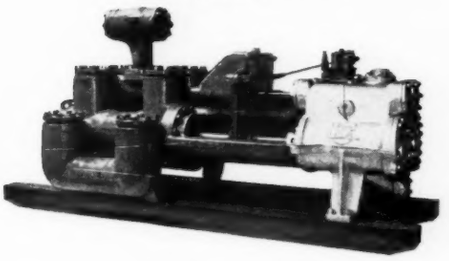
MACHINE ROTATIVE
No. FE-27½-B

Une machine rotative en une seule unité, extra-pesante et complètement enfermée, prévue pour une profondeur de forage de 10.000 pieds. Elle combine un tracé et une construction modernes qui en font une machine bien centrée et d'une douceur de fonctionnement extrême. Un emploi généreux d'acier spécial d'un bout à l'autre de ce rotatif en assure la marche efficace et sûre dans les conditions de forage les plus dures. Un graissage abondant est réalisé grâce à deux réservoirs, dont l'un sert à lubréfier le palier de table et l'autre lubréfie les engrenages de niveau. Chaque réservoir a une contenance de cinq gallons. Le poids brut de la machine prête pour exportation est de 12.975 lbs.

MAQUINA ROTATIVA
No. FE-27½-B

Una máquina rotativa, en un solo grupo, de gran rendimiento y completamente cerrada, con capacidad de perforación a una profundidad de 10.000 pies. En ella se combinan un trazado y una construcción que reducen un equipo muy bien proporcionado y de expedito funcionamiento. La extensa utilización de excelentes aleaciones de acero en toda la construcción de esta máquina le aseguran un funcionamiento seguro y eficaz bajo las más exigentes condiciones de perforación. La abundante lubricación está asegurada mediante dos depósitos: el uno para lubricar el cojinete de la mesa y el otro para lubricar los engranajes de nivel. Cada depósito tiene cabida para cinco galones. Peso bruto de la máquina lista para la exportacion, 12.975 libras.

IDEAL
"Reg. U. S. Pat. Off."



15½ x 8½ x 20
STEAM SLUSH PUMP

This pump is constructed to meet the severe requirements of modern drilling methods. Unusually large steam port passages are straight and as short as possible permitting steam to flow to and from cylinders with minimum friction. Maximum Recommended Steam Pressure per square inch is 350 pounds. Valve areas and passages are amply large to prevent turbulent flow and high fluid velocity. Maximum Recommended Water Pressure per square inch 2500 pounds.

Rock shaft stand is completely enclosed in oil tight case and is automatically lubricated. Gross Weight prepared for Export 22,300 pounds.

POMPE A BOUES A VAPEUR
15½ x 8½ x 20

Cette pompe a été étudiée pour répondre aux exigences rigides des méthodes modernes de forage. Les lumières d'entrée et de sortie de vapeur, de fort calibre, sont du type droit et aussi courtes que possible, ce qui permet à la vapeur de circuler avec un minimum de frottement soit vers les cylindres, soit en s'en éloignant. La pression de vapeur maximum recommandée est de 350 lbs. par pouce carré. Les surfaces de soupapes et le lumières sont amplement calculées pour prévenir l'écoulement turbulent ou rapide du fluide. La pression d'eau maximum recommandée est de 2500 lbs. par pouce carré.

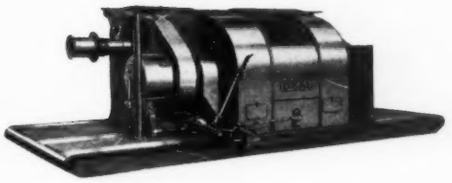
Le support d'arbre oscillant est complètement enfermé dans un carter hermétique à huile et est lubréfié automatiquement. Le poids brut de cette pompe prête pour l'exportation est de 22.300 lbs.

BOMBA VE VAPOR PARA EL BARRO O CIENO
de 15½ x 8½ x 20

Esta bomba está especialmente construida para responder debidamente a los exigentes requisitos de los modernos métodos de perforación. Los grandes orificios de entrada y de salida del vapor son rectos y lo más cortos posibles, para permitir que el vapor circule entre los cilindros, con un rozamiento mínimo. La máxima presión de vapor recomendada, por pulgada cuadrada, es de 350 libras. Las superficies de las válvulas y los conductos en general son bastante amplios para evitar la corriente turbulenta o rápida del flúido. La máxima presión de agua recomendada, por pulgada cuadrada, es de 2.500 libras.

El soporte del árbol oscilante está completamente encerrado en una caja hermética al aceite y se lubrica automáticamente. El peso bruto de esta bomba, lista para la exportación, es de 22.300 libras.

IDEAL
"Reg. U. S. Pat. Off."



No. 23-7½-M
DRAW WORKS

A heavy duty 2-shaft, 3-speed Unit Type Draw Works having two heavy structural steel side frames mounted on 20-foot H-beam skids. This type of construction combines ease of transportation and installation.

Other features of design include—positive lubrication to all chains and sprockets, centralized lubrication for the Compound Equalizing Brake providing accessibility, heavy duty self-aligning roller bearings, built-in bearing boxes, water cooled brake rims, optional machine cut sprockets and optional provision for a hydromatic brake. Gross Weight prepared for Export 33,040 pounds.

GROUPE DE TRACTION
No. 23-7½-M

Un groupe de traction de service dur en une seule unité, à 2 arbres et à 3 vitesses, qui a deux fortes flasques en acier profilé, montées sur patins à poutrelle en H de 20 pieds. Ce type de construction réunit facilité de transport et facilité d'installation.

Citons parmi les autres caractéristiques de construction: graissage positif à toutes les chaines et pignons, lubrification centralisée pour le frein équilibreur composé d'où accessibilité, roulements à rouleaux de service dur et d'alignement automatique, cages de paliers faisant corps, jantes de freins refroidies à l'eau, pignons taillés à la machine comme équipement facultatif, de même qu'un frein hydromatique. Le poids brut du groupe de traction prêt pour l'exportation est de 33.040 lbs.

GRUPO DE TRACCION
No. 23-7½-M

Una máquina de tracción de servicio pesado, en un solo grupo, con dos árboles y tres velocidades, que tiene dos firmes armazones laterales de acero grueso de construcción, montados en patines de vigas en H de 20 pies. Este tipo de construcción ofrece facilidad de transporte y de instalación.

Entre otras importantes características de construcción ebemos citar las siguientes: lubricación positiva a todas las cadenas y piñones, lubricación centralizada para el freno de compensación de tipo compuesto, lo que facilita su acceso; cojinetes de rodillos de alineación automática, de servicio pesado; cajas de cojinetes que forman parte integrante, llantas de frenos enfriadas por agua; piñones tallados a máquina, como equipo a elección y provisión para un freno hidromático, también a lección. El peso bruto de este grupo de tracción, preparado para le exportación, es de 33.040 libras.

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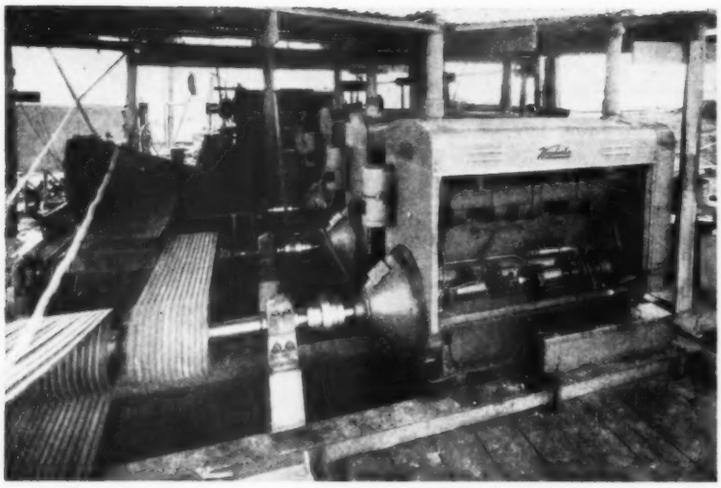
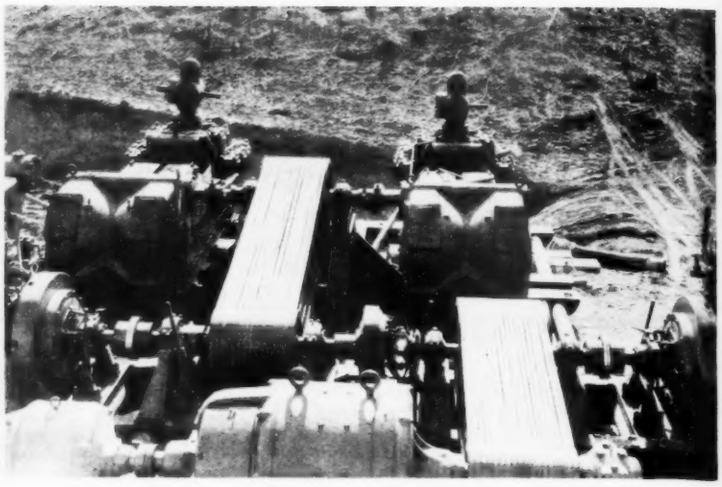




More TWIN DISC CLUTCHES are in use in Oil Field Service *than all other makes combined*

Because twelve years' extensive experience in the oil fields and an intimate knowledge of the industry's requirements have enabled Twin Disc engineers to design clutches and power take-offs that are successfully standing up under the most gruelling conditions. Write for specific recommendations. Engineering data on request.

POWER TAKE-OFF UNITS

The use of high speed multi-cylinder engines in oil well pumping service demands a self-contained power take-off unit as a link in the drive between engine and pumping rig—for efficient starting . . . easy picking up of the load . . . and satisfactory application of pulley or V-belt drive. Complete clutch power take-off assembly, mounted in rigid, cast iron housing, constitutes a self-contained unit. All anti-friction bearings are selected with liberal safety factors to insure long life. Twin Disc Power Take-Offs are applicable to industrial engines having S.A.E. flywheel housing dimensions. Write for Bulletin No. 105.

MODEL "E" CLUTCHES

Twin Disc Model "E" Clutches incorporate the latest features in clutch design and provide greatest possible ruggedness. Over-all dimensions are held to a minimum to conserve installation room. Maximum bores are large enough to accommodate oversize shafts. Enclosed feature permits operation in the open without special housings or guards. Needle bearings at pivot points of clutch levers, and hardened and ground parts in the engaging mechanism, assure easy engaging action. Available in single and two plate assemblies, from 14" to 42" in diameter; sizes suitable for a range of from 13 to 200 h.p. per 100 rpm. Write for Bulletin No. 108.

Davantage d'EMBRAYAGES TWIN DISC sont employés en service de champ pétrolifère *que toutes les autres marques ensemble.*

La raison en est que douze ans d'expérience variée sur les champs pétrolifères et une connaissance intime des besoins de l'industrie ont permis aux ingénieurs Twin Disc de mettre au point des embrayages et des prises de force motrice qui résistent brillamment dans les conditions d'emploi les plus dures. Demandez-nous nos recommandations spécifiques. Données techniques sur demande.

APPAREILS DE DéMARRAGE

L'emploi de moteurs de grande vitesse à cylindres multiples en service de pompage de puits pétroliers exige un groupe de prise de force motrice autonome comme liaison dans la transmission entre le moteur et l'appareillage de pompage—et cela afin de réaliser un démarrage effieace . . . un entrainement facile de la charge . . . et une application satisfaisante de la commande à poulie ou à courroie trapézoïdale. L'ensemble complet de prise de force motrice d'embrayage, monté dans un carter rigide, en fonte, forme un groupe autonome. Tous les paliers antifriction sont sélectionnés avec tous facteurs de sécurité amplement calculés pour assurer une longue vie utile. Les prises de force motrice Twin Disc peuvent s'appliquer aux moteurs industriels ayant les cotes S.A.E. du carter de volant. Bulletin No. 105 sur demande.

EMBRAYAGES MODELE "E"

Les embrayages Twin Disc Modèle "E" possèdent les tout derniers perfectionnements en construction d'embrayages et offrent toute la robustesse qu'on puisse désirer. Les dimensions extérieures sont aussi réduites que possible pour épargner la place dans la salle d'installation. Les alésages maximums sont assez grands pour recevoir les arbres à surépaisseur. Le mécanisme étant complétement enfermé, on n'a pas besoin, pour l'emploi au dehors, d'avoir recours à un carter ou protecteur spécial. Des paliers à aiguilles prévus aux points de pivotement des leviers d'embrayage, ainsi que des pièces trempées et rectifiées dans le mécanisme d'engagement, assurent une mise en prise facile. Offerts en groupes monodisque et à double disque, de 14 à 42 pouces de diamètre; gamme de tailles correspondant à une gamme de 13 à 200 CV à 100 t/m. Bulletin No. 108 sur demande.

Hay más EMBRAGUES TWIN DISC dedicados al servicio en campos petrolíferos, *que el total de todas las demás marcas juntas.*

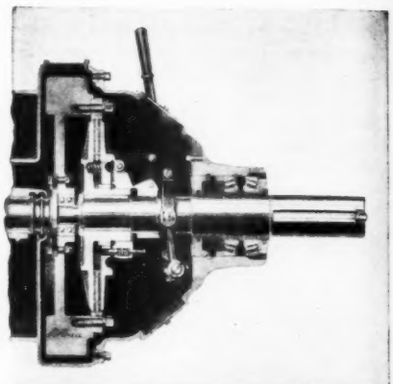
La razón de esto es que doce años de variada experiencia en los campos petrolíferos y un conocimiento íntimo de las necesidades de la industria han permitido a los ingenieros de la Twin Disc perfeccionar embragues y tomadores de fuerza motriz que resisten perfectamente en las condiciones de empleo más exigentes. Pídanos recomendaciones especificas. Datos tecnicos a solicitud.

GRUPOS DE TOMADORES DE FUERZA MOTRIZ

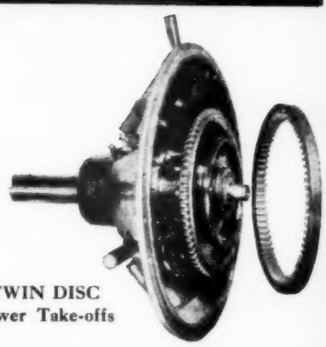
El empleo de motores de alta velocidad, de cilindros múltiples, en la instalación de bombas de pozos petrolíferos, exige un grupo de tomador de fuerza motriz independiente, como eslabón en la transmisión entre el motor y el equipo de bomba, a fin de realizar un arranque eficaz, un manejo fácil de la carga y una aplicación satisfactoria de la transmisión o propulsión por polea o correa trapezoidal. El grupo completo de tomador de fuerza motriz de embrague, instalado en una caja rígida, de hierro fundido, forma una instalaeión independiente muy útil. Todos los cojinetes antifricción comprenden todos los factores de seguridad ampliamente calculados para asegurar una gran duración efectiva. Los tomadores de fuerza motriz Twin Disc pueden aplicarse a motores industriales con cajas de volante de dimensiones según los patrones de la S.A.E. Sírvase pedirnos nuestro boletín No. 105.

EMBRAGUES, MODELO "E"

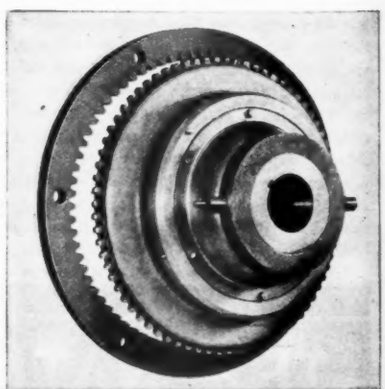
Los embragues Twin Disc de modelo "E" poseen todos los más recientes perfeccionamientos en construcción de embragues y ofrecen toda la resistencia y duración que se pueda desear. Las dimensiones totales se han reducido lo más que se ha podido, para ahorrar espacio en la sala de instalación. Las admisiones son bastante grandes para recibir árboles de sobretamaño. El mecanismo, por estar completamente encerrado, no requiere tapas o protectores, al emplearse en puntos descubiertos. Los cojinetes de agujas en que funcionan los pivotes de las palancas de embrague, lo mismo que las piezas endurecidas y esmeriladas del mecanismo de acoplamiento, aseguran una fácil acción segura y expedita. Se ofrecen en grupos monodiscos y de disco doble, de 14 a 42 pulgadas de diámetro, en capacidades correspondiente a una escala de potencia de 12 a 200 c. de f. por 100 r.p.m. Sírvase pedirnos nuestro boletín No. 108.



TWIN DISC POWER TAKE-OFF SECTIONAL VIEW



TWIN DISC
Power Take-offs



TWIN DISC MODEL "E" SINGLE PLATE CLUTCH

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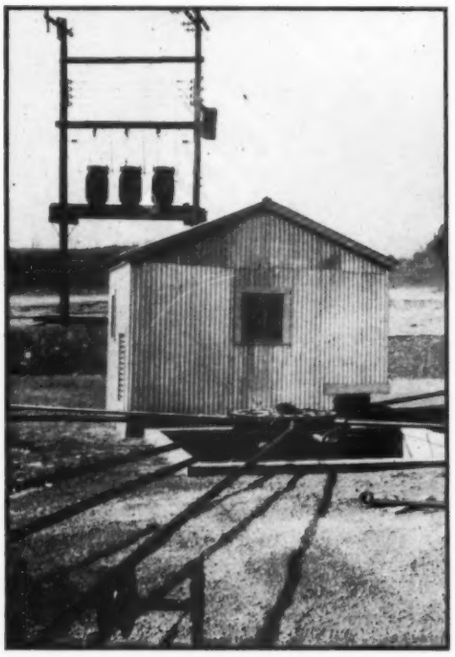
(Continued from Page 226)

elements gathered in its passage through the formation. In this way the water can be kept in a uniform condition.

Thought has been given to introducing water with selected characteristics so interfacial tension might be controlled and more effectively wash the film of oil from the individual grains of sand. This is a highly theoretical advantage as there are so many unknown variables encountered in the reservoir rock it is improbable it will ever be applied with any assured success.

Oil sand can be best freed of its film of oil by washing in specially prepared water where this sand has been mined and may be treated in plants



Central pumping power

on the surface or underground especially designed. This system of washing sand is being applied to the bituminous sands found at the surface in Canada. This washing method may be used underground to treat oil sands removed from formations previously worked through drilled wells. As waterflooding will only recover from 40 to 60 per cent of the remaining oil it is possible oil mining and treatment of sand may be resorted to eventually.

WATER DISPOSAL

Water disposal, if improperly carried out, is one of the highest costs to be met on an oil-producing property. Since its cost has often been unnecessarily high, those having to pay for it are emphasizing its importance to employes. Because of new legislation passed and under consideration, its importance increases yearly. There are, of course, many fields where it is not, and never has been a problem, either because no appreciable quantity of salt water was produced, or because there were no objections to discharging it into nearby streams or rivers. In many fields all that was necessary was to run it out of the tank on the ground and allow it to seep into the soil or find its way to a creek. Practically all of the more recently discovered pools have a much greater problem, and in some fields, notably those in Michigan, water disposal is the most serious problem encountered.

The present trend in water disposal is toward the practice of putting it into abandoned wells so that it finds its way into either the productive zone or some other porous strata. The practice

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d'extraction de pétrole tous à la fois, on créerait une région de basse pression autour du puits à pétrole, ce qui aurait tendance à déséquilibrer la force appliquée pour chasser le pétrole hors du sable, et il se pourrait que l'eau parvienne jusqu'au puits d'extraction de pétrole ou encore que le pétrole se déplace d'une manière irrégulière à travers le sable, en chassant devant elle une certaine quantité d'eau.

Il importe de choisir avec un soin tout particulier l'eau de noyage, de sorte qu'il est courant de traiter l'eau avant son emploi. L'eau la plus recommandable est celle ayant un coefficient de neutralité aussi fort que possible. Une telle eau ne contiendra pas de quantité appréciable de particules solides qui pourraient se précipiter dans les pores du sable par suite de certaines réactions chimiques lorsque les eaux de noyage et du gisement viennent à se mélanger. En outre, une telle eau n'est pas si susceptible de dissoudre en contact avec le gisement des quantités appréciables de matières solides, ces dernières risquant de se déposer dans d'autres espaces de pores avant que l'eau sorte par le puits d'extraction à la suite du pétrole.

L'eau de noyage pourra éventuellement être réutilisée dans le cycle, mais si elle était d'un coefficient pH neutre à son entrée dans la formation, il n'est pas difficile d'en précipiter tous sels ou éléments solubles qu'elle aura pu dissoudre à son passage à travers la formation. De cette façon, on peut maintenir l'eau d'une qualité uniforme.

On a pensé aussi à introduire dans le système de l'eau possédant certaines caractéristiques sélectionnées, afin de régler la tension interfaciale et laver d'une manière plus efficace la pellicule de pétrole et la débarrasser des grains individuels de sable. Il ne s'agit là que d'un avantage très théorique, car il faut compter sur tant d'inconnues dans le parcours à travers les roches de la formation, de sorte qu'il est peu propable qu'on puisse jamais appliquer cette méthode avec la certitude des résultats.

Le meilleur moyen de débarrasser les sables pétroliers de leur pellicule de pétrole consiste à les laver dans une eau spécialement préparée aux lieux mêmes où ces sables ont été extraits, puis à les traiter dans des ateliers spécialement installés en surface ou sous terre. Cette méthode de lavage des sables est notamment appliquée aux sables bitumineux qu'on trouve en surface au Canada. On peut encore utiliser ce procédé sous terre pour traiter les sables pétroliers extraits de formations qu'on avait exploités précédemment au moyen de puits de forage. Etante donné que le noyage à l'eau ne permet que d'extraire que de 40 à 60 pour cent des pétroles restants, il y a des cas où on aura intérêt à avoir recours à des opérations minières d'extraction du pétrole, ainsi qu'au traitement des sables.

EVACUATION DE L'EAU

Lorsqu'elle n'est pas effectuée d'une manière rationnelle, l'évacuation de l'eau est une des sources de frais les plus sérieuses dans l'exploitation des concessions pétrolières. Vu que ces frais ont souvent été beaucoup plus élevés qu'il n'était nécessaire, les exploitants ont été amenés à attirer l'attention des employés sur leur importance. Par suite de nouvelle législation adoptée et en cours d'étude, l'importance de cette question va en augmentant chaque année. Il va sans dire que, dans de nombreux champs, cette question ne s'est pas présentée et n'y a jamais été un problème, soit parce qu'il n'y était pas produit de quantité appréciable d'eau salée, soit encore parce qu'il n'y avait pas d'objections à ce qu'elle soit déchargée dans les rivières ou fleuves voisins. Dans un grand nombre de champs pétroliers, il suffisait tout simplement de la laisser s'écouler du réservoir sur le sol, puis de la laisser pénétrer dans le terrain ou

(Continué sur Page 234)

(Continué de Página 226)

las partículas individuales de arena. Esta es una ventaja de valor puramente teórico, pues hay tantos factores variables y desconocidos en la formación que es muy dudoso que llegue alguna vez a aplicarse con verdadera seguridad de éxito.

La arena petrolífera se desprende mejor de su película de petróleo mediante lavado en agua especialmente preparada, en el punto de donde se ha extraido, o bien puede tratarse en plantas superficiales o subterráneas proyectadas exclusivamente para este fin. Este sistema de lavado de arena se está aplicando a arenas bituminosas en yacimientos superficiales en el Canadá. Este método de lavado puede usarse en aplicación subterránea, para tratar arenas petrolíferas quitadas de formaciones previamente pasadas por pozos perforados. Como la inundación con agua puede sólo recobrar de 40 a 60% del resto del petróleo, es muy posible que algún día se recurra a la extracción y tratamiento de la arena petrolífera.

DISPOSICION DEL AGUA

Cuando no se efectúa de una manera racional, la disposición del agua constituye una de las más serias fuentes de gastos en la explotación de concesiones petroleras. Como estos gastos han sido, a menundo, mucho más grandes que lo que era necesario, los explotadores se han visto obligados a llamar la atención de sus empleados hacia su importancia. A causa de nueva legislación adptada o en curso de estudio, la importancia de este asunto ha venido aumentando cada año. Por supuesto, hay numerosos campos en que esta cuestión no se ha presentado y constituido un serio problema, debido a que no ha habido en ellos una producción considerable de agua salada o a que no ha habido objeción a que el agua salada presente se descargue en los ríos o en otras vías fluviales cercanas. En un gran número de campos petrolíferos, todo lo suficiente ha sido vaciarla del tanque o depósito al suelo, dejándola colarse en el suelo o escaparse naturalmente por algún estero. Por otra parte, casi todos los yacimientos descubiertos últimamente, presentan un problema mucho más serio, particularmente aquellos en el estado de Michigan, Estados Unidos, y muy bien se puede decir que la disposición del agua, en estos puntos, constituye un problema de bien difícil solución.

La tendencia actual, en materia de disposición del agua, da creciente preferencia a la práctica de consiste en llevar esta agua a los pozos abandonados, para que el líquido llegue a la zona productora o a alguna otra estrata porosa. La práctica que consiste en inyectarla en la formación explotada, tiene actualmente, un creciente número de adeptos, pero su propagación está retardada a causa del hecho de que no se puede anticipar el efecto de este procedimiento sobre los pozos vecinos, que están en activa producción. Esta procedimiento podría describirse diciendo que es sencillamente una combinación de inundación de agua y disposición de agua, pero al mismo tiempo, debemos recordar que la mayor parte de los campos petrolíferos, que presentan un serio problema de disposición de agua, producen de yacimientos calcáareos, y el procedimiento de inundación de agua nunca se ha empleado en acquellos con más de dos o tres pozos bien distanciados, como medio de disposición de agua exclusivamente. Por esta razón, no existe actualmente una base de conclusión, para saber el efecto que puede tener la inundación de agua sobre los yacimientos o depósitos en formaciones calcáreas. La ausencia completa de uniformidad en las estratas, hace, en efecto, que esta práctica resulte aventurada o incierta. Las zonas porosas, que se encuentran en la sección arriba de las capas productivas, son siempre muy tentadoras, y por esta razón, algunos explotadores, además de reabrir los antiguos hoyos de perforación hasta estas zonas, perforan nuevos pozos con el único objeto de inyectar el agua residuaria en las capas del yaci-

(Continué en Página 234)

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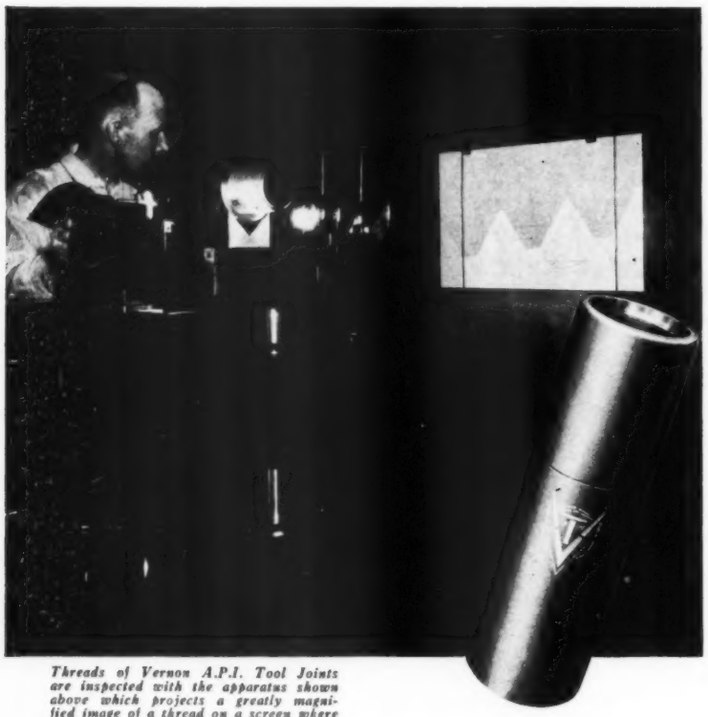
DR. V. HENNY

Representative of the — *Representante de la* — *Représentant de la*

Universal Oil Products Company, Chicago

Owner of Dubbs Process — Propietaria del Procedimiento Dubbs — Propriétaire du Procédé Dubbs

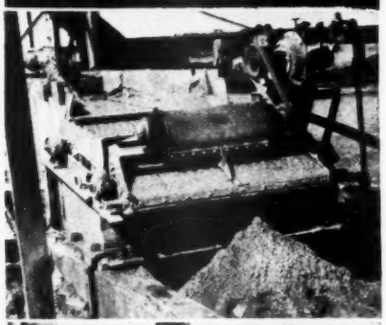
Bush House, Aldwych, London, W. C. 2



Threads of Vernon A.P.I. Tool Joints are inspected with the apparatus shown above which projects a greatly magnified image of a thread on a screen where it is matched against an outline drawing of a perfect thread to check form, pitch and taper.

McNEELY VIBRATING MUD SCREEN

TYPICAL INSTALLATION VIEWS OF THE McNEELY VIBRATING MUD SCREEN



McNEELY VIBRATING ROTARY MUD SCREEN

The McNEELY VIBRATING ROTARY MUD SCREEN fully meets all requirements for a large capacity, rugged, conveniently handled shaker screen for economically removing sand and shale from rotary drilling fluid. All parts are built with a high strength factor of safety to allow for rough handling. Wire cloth life is often ten to twelve weeks of continuous service; the cloth is held securely on the curved screen frame (an exclusive feature) and cannot whip or flex. Curved screen surface provides rapid removal of waste cuttings and an equal distribution of the vibrating force eliminates dead spots. Unit type of construction saves ground space and headroom and makes installation and removal quick and easy. Provided with integral steel approach and discharge ditches. Under favorable conditions, capacity is 650 gallons per minute. Powered by electric motor, gas engine or steam turbine and a 3 horsepower rating is sufficient. Write for Bulletin No. 100 for full particulars.

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GULF COAST AND MID-CONTINENT REPRESENTATIVE - BAROID SALES CO. - HOUSTON, TULSA

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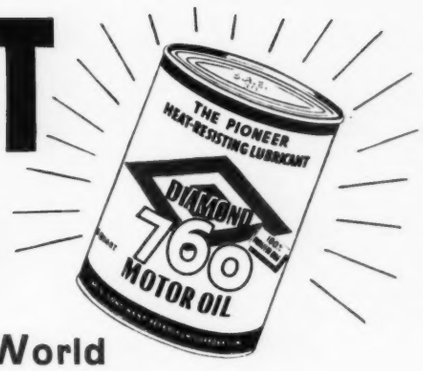

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PETROLATUM—Melting points 140-145, 145-150, 150-155.

The Service

Mid-Continent maintains complete facilities for handling shipments in bulk, drums, barrels and smaller packages from the port of New Orleans. Bulk and barrel stocks are carried at convenient points throughout the United Kingdom and Continental Europe.

La Source

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Les Produits

HUILE A MOTEUR DIAMOND 760—Au premier rang dans la série Diamond de lubréfiants sous marque de fabrique et un produit de la plus haute qualité. Grande résistance à la chaleur . . . essai de froid intense . . . base de paraffine 100%. Logée dans des boîtes lithographiées de 1 quart, 5 quarts et 5 gallons, ainsi qu'en tambours et en barils.

HUILE A MOTEUR FAULTLESS—Base de paraffine 100% . . . n'est dépassée que par l'huile Diamond 760. Logée en boîtes lithographiées de 1 quart, 5 quarts et 5 gallons, ainsi qu'en tambours et en barils.

HUILES CLAIRES—Les huiles claires Mid-Continent jouissent d'une réputation enviable pour la qualité parmi les grossistes et les doseurs sur le marché national et à l'étranger. Points d'inflammation et de combustion élevés . . . faible teneur en carbone . . . Aspect extérieur excellent . . . viscosités de 100 à 210 jusqu'à 200 à 210.

HUILES NEUTRES—Une série remarquable de produits neutres pâles ayant un record sans précédent de succès sur les marchés nationaux et étrangers. Viscosités allant jusqu'à 600 à 100 . . . haut point d'inflammation . . . bas point de coagulation . . . résidu de carbone très faible . excellente couleur.

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HUILES DE CYLINDRE RAFFINEES A LA VAPEUR—Hauts points d'inflammation et de combustion . . . faible résidu de carbone . . . bas point de coagulation . . . excellente couleur verte . . . qualité extra-supérieure.

HUILES NOIRES—HUILES DE TRANSMISSION—Haut point d'inflammation . . . faible teneur de soufre . . . bas point de coagulation . . . toute viscosité depuis 50 à 210 jusqu'à 5000 à 210. Le choix exclusif d'un grand nombre de fabricants d'automobiles, ainsi que de grossistes et de doseurs, dont la préférence se base sur des essais poussés et une longue expérience.

HUILES INDUSTRIELLES—Huiles de turbines, dynamos, Diesel, cylindres à vapeur, et toutes les catégories d'huiles industrielles fabriquées sur spécifications.

CIRE DE PARAFFINE—Fibre d'une longeur exceptionnelle . . . couleur et odeur excellentes . . . reconnue comme la plus haute qualité de cire de pétrole brut semi-raffinée sur le marché.

PETROLATUM—Points de fusion 140-145, 145-150, 150-155.

Le Service

Mid-Continent dispose de facilités complètes pour faire les envois en vrac, tambours, barils et plus petits récipients par le port de la Nouvelle-Orléans. Les huiles en vrac ou en barils sont transportées à des points convenables de la Grande-Bretagne et de l'Europe Continentale.

La Fuente

Desde hace 15 años, los lubricantes de la Mid-Continent Petroleum Corporation han gozado de una envidiable reputación a causa de su invariable excelente calidad. Se conocen en todos los países civilizados y actualmente la Mid-Continent figura entre las principales exportadoras de lubricantes de los Estados Unidos.

Los Productos

ACEITE DE MOTOR DIAMOND 760—El primero en el surtido Diamond de lubricantes vendidos bajo su marca de fábrica. Es un producto de primer orden, en todo sentido. Gran resistencia al calor . . . bajo punto de vaciado . . . base de parafina de 100%. Se suministra en envases litografiados de 1 cuarto, 5 cuartos de galón y de 5 galones, lo mismo que en tambores y barriles.

ACEITE DE MOTOR FAULTLESS—Base de parafina de 100% . . . solo es sobrepasado por el aceite Diamond 760. Se suministra en envases litografiados de 1 cuarto, de 5 cuartos de galón y de 5 galones, lo mismo que en tambores y barriles.

ACEITES CLAROS—Los aceites claros Mid-Continent gozan de merecida reputación por su superior calidad entre los comerciantes al por mayor del ramo y los mezcladores de lubricantes, en los mercados nacionales y en los del extranjero. Puntos de inflamación y de combustión elevados . . . leve contenido de carbón . . . Aspecto exterior excelente . . . con viscosidades de 100 a 210 hasta 200 a 210.

ACEITES NEUTROS—Una serie notable de productos neutros pálidos, que tienen un precedente sin paralelo en aceptación en los mercados nacionales y del extranjero. Viscosidades hasta de 600 a 100 . . . alto punto de inflamación . . . bajo punto de coagulación . . . residuo de carbón muy limitado . . . color excelente.

ACEITES EXTRAIDOS POR DISOLVENTES—Un surtido completo de aceites producidos por un procedimiento exclusivo de la propiedad de la Mid-Continent Petroleum Corp. Alto índice de viscosidad . . . baja volatilidad . . . color claro . . . aspecto exterior excelente . . . alto peso específico . . . resistente a la oxidación . . . muy limitado residuo de carbón.

ACEITES DE CILINDRO REFINADOS POR VAPOR—Altos puntos de inflamación y combustión . . . poco residuo de carbón . . . bajo punto de coagulación . . . excelente color verde . . . calidad excelente en todo sentido.

ACEITES NEGROS—ACEITES DE TRANSMISION—Alto punto de inflamación . . . limitado contenido de azufre . . . bajo punto de coagulación . . . de toda viscosidad, de 50 a 210 a 5000 a 210. La elección exclusiva de un gran número de fabricantes de automóviles, lo mismo que de comerciantes al por mayor del ramo y mezcladores de lubricantes, cuya preferencia se basa sobre los más exigentes ensayos y larga experiencia.

ACEITES INDUSTRIALES—Aceites de turbinas, dinamos, motores Diésel, cilindros de vapor y todas las categorías de aceites industriales fabricados de acuerdo con especificaciones particulares.

CERA DE PARAFINA—Fibra de una longitud extraordinaria . . . color y olor excelentes . . . aceptada como la cera de petróleo bruto semi refinada más fina del mercado.

PETOROLATO—Puntos de derretimiento de 140-145, 145-150, 150-155.

El Servicio

La Mid-Continent disponde de facilidades completas para efectuar los envíos en tanques, tambores, barriles y en envases más pequeños, por el puerto de Nueva Orleans. Los aceites en grandes envases se mantienen en existencia en convenientes puntos en Inglaterra y la Europa Continental.

MID-CONTINENT PETROLEUM CORPORATION

TULSA, OKLAHOMA, U. S. A.

Foreign Representatives:

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Paris

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of injecting it into the pay formation is gaining favor, but its use is retarded because the effect it will have on nearby wells producing oil from the formation cannot be anticipated. It might be stated that such a procedure is merely combining water-flooding with water disposal, but most fields with a serious water-disposal problem produce from limestone reservoirs, and water-flooding has never been employed on such reservoirs using more than two or three widely separated wells, with the main object always water disposal. Therefore, there is no basis for conclusions as to effect that water-flooding will have on limestone reservoirs. The complete lack of uniformity in the strata makes the practice appear somewhat hazardous. Porous zones occurring in the section above the pay are always inviting, and besides plugging back old producers to such horizons, new wells are sometimes drilled for the sole purpose of injecting waste water into the strata. Excellent disposal strata have recently been found by deepening old Michigan producers to porous zones several hundred feet below the pay.

In many cases salt water is discharged into the producing wells between two strings of casing. The flow string prevents it from getting into the pay zone, so it flows into whatever porous zones exist in the exposed section.

In West Texas fields cavernous strata is often found at a depth of 600 or 700 feet. This greatly simplifies water disposal, since the capacity of the strata is practically unlimited, and no resistance is offered. In consolidated strata, especially when it carries water, a considerable surface pressure must often be applied by pumps to aid the fluid head in overcoming formation pressure and friction.

Evaporation pits are losing popularity for brine disposal. Their use is still general in many fields, but trouble often results because of seepage damaging cultivated land or underground fresh water supply. Also, rains are likely to cause overflow. In some cases a layer of mud is applied to prevent seepage, but brine coagulates this. In one or two isolated cases ways have been found to use the waste brine to advantage, such as in the manufacture of industrial chemicals.

CONTROL OF WATER IN WELLS

Much has been written about disposal of water produced along with oil and great progress has been made in this direction. The modern engineer is looking upon this problem from another angle and that is to control water in wells so it will not be necessary to deliver it to the surface in the first place and in this manner eliminate the necessity of having to make disposition of it later.

In many fields water supplies much of the energy available in the reservoir for moving the oil toward the well bores. If proper reservoir pressures are maintained at all times the natural water-flood will be so controlled and the oil recovered at such rate as to prevent the water from breaking through to the well in advance of the oil. This is an ideal condition but one possible to obtain approximately if modern engineering practices are applied to new fields and if applied to older fields much good can be accomplished by controlling rate of production of gas and oil.

As all oil fields ultimately arrive at a pumping stage when it is costly to lift the fluid to the surface much study has been devoted to outlining drilling and producing methods which will reduce to a minimum the quantity of water pumped with the oil. Minimum penetration of the pay zone is one means of retarding water movement to the well. As soon as a commercial well has been secured it is good policy to stop drilling deeper into the pay formation. Another essential control feature is to eliminate or modify potential tests and establish uniform and comparatively low rates

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s'échapper par une crique naturelle. Par contre, la plupart des nappes découvertes plus récemment présentent un problème beaucoup plus sérieux, et dans certains champs pétroliers, notamment ceux de Michigan, on peut dire que l'évacaution de l'eau constitute le problème le plus sérieux à résoudre.

La tendance actuelle en matière d'évacuation de l'eau est de plus en plus la pratique qui consiste à amener cette eau dans des puits abandonnés, afin que celle-ci puisse parvenir soit à la zone productrice, soit à quelque autre couche poreuse. La pratique qui consiste à l'injecter dans la formation exploitée gagne actuellement en faveur, mais sa propagation est retardée par suite du fait qu'on ne peut pas prévoir l'effet de ce procédé sur les puits voisins qui tirent le pétrole de la formation. On pourrait décrire ce procédé comme étant simplement une combinaison du noyage à l'eau avec l'évacuation de l'eau, mais la plupart des champs pétroliers qui présentent un problème sérieux d'évacuation d'eau, produisent de réservoirs calcaires, et le procédé du noyage à l'eau n'a jamais été employé sur de tels réservoirs avec plus de deux ou trois puits très espacés, le but principal visé étant toujours l'evacuation de l'eau. Par suite, on n'a pas de base de conclusion pour savoir l'effet que peut avoir le noyage à l'eau sur les réservoirs de formation calcaire. L'absence complète d'uniformité dans les couches rend, en effet, cette pratique quelque peu aléatoire. Les zones poreuses qui se trouvent dans la section au-dessus des couches productrices sont toujours tentantes, et on ne se contente pas seulement de rouvrir d'anciens trous de forage jusqu'à ces zones, mais encore on perce parfois de nouveaux puits dans le seul but d'injecter de l'eau résiduaire dans les couches du gisement. On a récemment trouvé des couches d'evacuation excellentes pour l'eau en creusant plus profondément d'anciens gisements producteurs Michigan pour atteindre des zones poreuses à plusieurs centaines de pieds de profondeur en-dessous des couches productrices.

Dans de nombreux cas, l'eau safée est déchargée dans les puits producteurs entre deux faisceaux de revêtements. Le faisceau d'écoulement l'empêche de pénétrer dans la zone productrice ou payante, de sorte qu'elle pénètre dans les diverses zones poreuses qui se présentent dans la section exposée.

Dans les champs pétroliers du Texas Occidental, on trouve souvent des couches poreuses à une profondeur de 600 ou 700 pieds. Ceci simplific grandement l'évacuation de l'eau, car la capacité de ces couches est à peu près illimitée et on n'y rencontre aucune résistance. Dans les formations à couches consolidées, et en particulier lorsqu'elles contiennent dè l'eau, on est obligé d'appliquer le plus souvent une forte pression en surface au moyen de pompes afin d'aider la tête fluide à vaincre la pression de formation et les frottements.

Les fosses à évaporation perdent de leur popularité pour l'evacuation des saumures. Cependant, leur emploi est encore général dans de nombreux champs, mais il entraîne souvent des ennuis sérieux par suite de suintement ou infiltration contaminant des terrains cultivés ou des réservoirs souterrains d'eau potable. En outre, les pluies risquent d'entraîner une submersion totale. Dans certains cas, on applique une couche de boue pour enrayer le suintement, mais les saumures la coagulent. Dans un ou deux cas isoles, on a trouvé moyen d'utiliser avantageusement les saumures résiduaires, comme par exemple dans la fabrication de produits chimiques industriels.

CONTROLE DE L'EAU DANS LES PUITS

On a écrit des volumes sur la question de l'evacuation de l'eau extraite en même temps que le pétrole, et on a fait des progrès marqués dans ce sens. L'ingénieur moderne considère ce prob-

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miento. Recientemente se han encontrado excelentes capas de disposición de agua perforando más profundamente antiguos yacimientos productores en Michigan, para llegar a zonas porosas a muchos centenares de metros de profundidad debajo de las estratas productivas.

En numerosos casos, el agua salada se descarga en los pozos productivos, entre dos hileras de revestimientos. El sistema de flujo no la deja penetrar en la zona productiva, de suerte que ella se mete en las diversas zonas porosas que se presentan en la sección expuesta.

En los campos petrolíferos del oeste de Texas, se presentan, a menudo, capas porosas a una profundidad de 600 o 700 pies. Esto simplifica grandemente la disposición del agua, a causa de que la capacidad de estas capas es casi ilimitada, sin presentar resistencia alguna. En las formaciones con capas consolidadas, y particularmente cuando ellas contienen agua, se presenta, a menudo, la necesidad de aplicar una fuerte presión a la superficie, mediante bombas, a fin de ayudar a la cabeza o columna flúida a vencer la presión de la misma formación y rozamiento presente.

Los fosos de evaporación están perdiendo su popularidad para la disposición de las salmueras. Sin embargo, su empleo es todavía general en numerosos campos, pero implica, a menudo, serios inconvenientes, a causa de que su infiltración contamina los terrenos cultivados o las reservas subterráneas de agua potable. Por otra parte, las lluvias pueden causar una anegación total. En algunos casos, se ha aplicado una capa de barro para evitar la infiltración, pero la salmuera la coagula. En uno o dos casos aislados, se han descubierto medios de utilizar ventajosamente las salmueras residuarias, como por ejemplo, en la fabricación de productos químicos industriales.

CONTROL DEL AGUA EN LOS POZOS

Mucho se ha escrito sobre el tema de la disposición del agua extraía simultáneamente con el petróleo, y notables progresos se han alcanzado en este sentido. El ingeniero moderno estudia este problema desde otro punto de vista, es decir, trata de controlar el agua en los mismos pozos, para que no haya necesidad de levantarla a la superficie del campo petrolífero, para evitar, de esta manera, la obligación de desprenderse de ella, por algún método de disposición, después de llegada a la superficie.

En numerosos campos petrolíferos, el agua se aprovecha para que suministre una buena parte de la energía presente en el yacimiento y que se necesita para mover el petróleo hacia los pozos de extracción. Cuando se toma debido cuidado para mantener, en todo momento, las presiones normales del yacimiento, la corriente natural del agua podrá controlarse entonces convenientemente y la extracción del petróleo se efectuará a buena velocidad, sin peligro de que el agua se adelante y salga por el pozo antes que el petróleo. Esta es, por supuesto, una condición ideal, pero es posible llegar a resultados muy aproximados a los ideales o teóricos, cuando a los nuevos campos petrolíferos se aplican métodos técnicos modernos, y aun al tratarse de yacimientos antiguos, pueden obtenerse resultados muy interesantes mediante una racional regulación de la rapidez de la producción de gas y de petróleo.

En vista de que todos los campos de petróleo llegan finalmente a un estado de bombaje o extracción que resulta proporcionalmente muy costoso para la elevación del líquido petrolífero a la superficie, se han emprendido profundos estudios, a fin de llegar a precisar métodos de perforación y de producción tendentes a reducir a un mínimo la cantidad de agua extraída del yacimiento conjuntamente con el petróleo. Una penetración mínima de la zona activa o productiva es un medio de retardar la circulación del agua en sentido del

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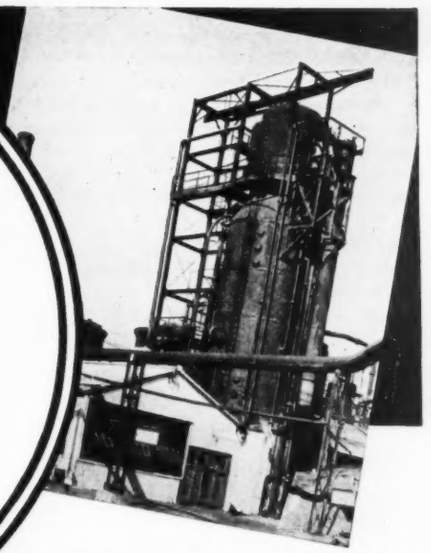


● Plant of Shell Oil Co. of Canada, Ltd., at Montreal. It's a Foster-Wheeler installation with Key fittings.

● Usine de la Shell Oil Co. of Canada, Ltd., à Montréal. C'est une installation Foster-Wheeler avec garnitures Key.

● Planta de la Shell Oil Co. of Canada, Ltd., en Montreal. Es una instalación Foster-Wheeler con acoplamientos y accesorios Key.

● The Barber Asphalt plant, Maurer, N. J. It's a Lummus installation with Series 3600 Key fittings.

● La fabrique de la Barber Asphalt, Maurer, N. J. C'est une installation Lummus avec garnitures Key de la Série 3600.

● La planta de la Barber Asphalt, en Maurer, N. J., E. U. A. Su instalación Lummus está provista de conexiones Key de la serie 3600.

Series 7000
Solid Body Type

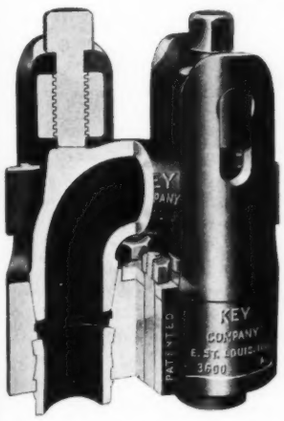
An improved design of the solid body type fitting having all the advantages of a stream line flow fitting. A new method of holding the hand hole closure plug, increased efficiency during inspection and clean-out periods. It is superior to the old type of dog and set screw assembly as it will carry a larger load with greater safety.

Série 7000
Type à corps massif

Un type perfectionné de garniture à corps massif qui possède tous les avantages d'une garniture à flot dans la ligne du courant. Une nouvelle méthode de fixation du bouchon de fermeture du trou de visite, ce qui augmente l'efficacité des tournées d'inspection et des nettoyages. Ce type est supérieur à l'ancien, qui comportait un loquet et une vis de réglage, car il est à même de supporter une plus forte charge avec une plus grande sécurité.

Serie 7000
Tipo de cuerpo sólido

Un modelo perfeccionado del tipo de cuerpo sólido, que tiene todas las ventajas de un acoplamiento de paso expedito. Un nuevo método de sujeción del tapón de cierre del agujero manual aumenta su utilidad durante los períodos de inspección y limpieza. Es superior al antiguo tipo de grapa y tornillo de presión, pues puede soportar una mayor carga con más seguridad.



Series 3600
Sectional Type

Adaptable to high and low pressure cracking operation with temperature limitation of 1025° F. U-Bend construction provides an unrestricted flow of the oil, decreases pressure drop to a minimum throughout the coil, eliminates turbulence and thus prolongs the life of fittings and tubes. Removable feature provides easy access for tube cleaning and inspection. Adaptable to any furnace design.

Série 3600
Type sectionnel

Adaptable à l'opération du cracking à haute et basse pression avec une limite de température de 1025° F. La construction à courbure en U assure une circulation non gênée du pétrole, réduit au minimum les chutes de pression sur toute l'étendue du serpentin, élimine la turbulence et ainsi prolonge la vie utile des garnitures et des tubes. Pouvant se démonter, on a accès facile dans le tube pour le nettoyage et la visite. Il est adaptable à tout type de foyer.

Serie 3600
Tipo seccional

Adaptable a destilación por "cracking" de alta y de baja presión, con limitación de temperatura a 1025° F. La curva en "U" provee una corriente de petróleo sin interrupción, reduce a un mínimo la merma de presión en todo el alambique, evita la turbulencia y de esta manera prolonga la duración de las conexiones y tubería. Ofrece la ventaja de poder quitarse para tener fácil acceso a la limpieza e inspección del tubo. Se adapta a cualquier modelo de horno.

Series 10,000
Fittings

Designed for use on heating coils operating at temperatures up to 1500° F., and pressures to 5,000 pounds. Made in two types (A) for use with carbon steel tubes of 4—7% chrome tubes; (B) for use with KA2S tubes. Adapted for many different designs and variations in assembly.

Série 10.000
Garnitures

Etudiées pour emploi sur serpentins de chauffage qui fonctionnent à des températures allant jusqu'à 1500° F. et des pressions pouvant atteindre 5000 lbs. Prévues en deux types: (A) pour emploi avec tubes en acier au carbone et tubes à 4-7% de chrome; (B) pour emploi avec des tubes KA2S. Elles se prêtent à de nombreuses constructions et à des variations de montage.

Serie 10.000
Conexiones

Proyectados para uso en alambiques de calentamiento que funcionan a temperaturas hasta de 1.500° F y presión máxima de 5.000 libras. Se hacen en dos tipos: el A para usarse con tubos de acero al carbono con 4 a 7% de cromo, y el B para tubos de KA2S. Se adaptan a numersos modelos y variaciones en montaje.

KEY COMPANY

EAST ST. LOUIS, ILLINOIS, U. S. A.

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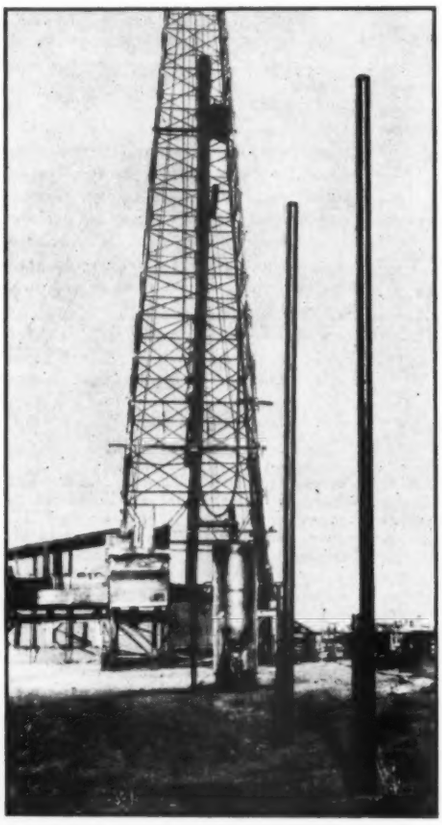
of withdrawal. Maintenance of a uniform back pressure at the face of the producing zone is a third essential to water control.

Where water has broken into a well there are available several methods of plugging back and shutting off this water but generally speaking such plugging back jobs result only in temporary relief for if the oil is still produced the salt water will again make its appearance in the bottom of the hole.

It is a wellknown fact that oil will be found above the salt water in any field capable of making water. As this oil will always tend to flow to the point of lower pressure, the well bore, it has been demonstrated that the minimum of penetration into the top of the producing formation will secure practically as much oil as a deeper penetration would have secured and do so with minimum production of water. The oil can reach the hole but the water is held back and to reach the well it is necessary for it to displace the oil between it and the bottom of the hole and this supplies energy to recover the oil and at the same time retards the rate of water movement to the well.

Maintenance of back pressure on the formation is also essential because the fluidity of water is about four times greater than that of an average oil and if back pressure is lowered the velocity of



Separator hookup and two gas vents

the flow of the oil is increased but not so great as the velocity flow of the water behind it.

Application of the above outlined principles will result in benefits accruing to the operator, royalty owner, and the state and for this reason it is probable state regulatory bodies will be empowered by law to issue uniform orders to be applied to future fields to allow the operators to regulate manner and rate of production of gas and oil so as to secure full benefits. Supervision of regulations by a state commission will probably be necessary unless all operators voluntarily agree to operate their properties in a uniform manner to obtain the best results, since one or two exceptions to general practice will nullify the desired conditions in the whole field.

léme sous un autre angle, à savoir qu'il se donne comme but de contrôler l'eau dans les puits mêmes afin de ne pas avoir à l'amener à la surface du champ pétrolier du tout, et ainsi d'éliminer complètement la nécessité de devoir assurer l'évacuation de l'eau si on l'amenait en surface.

Dans de nombreux champs pétrolifères, c'est l'eau qui fournit une bonne partie de l'énergie offerte par le réservoir ou gisement pour mettre le pétrole en mouvement et l'amener aux puits de forage. Si on a soin de bein maintenir en tout temps les pressions du réservoir naturel, le flot naturel d'eau sera contrôlé de telle façon et le pétrole extrait à une vitesse telle qu'il n'y aura pas à craindre que l'eau ne trouve moyen de devancer le pétrole et de parvenir aux puits avant ce dernier. C'est là une condition idéale, mais il est possible d'arriver à des résultats très voisins des résultats théoriques si l'on fait application des méthodes techniques modernes dans les nouveaux champs pétrolifères; et, dans le cas d'application aux anciens chantiers, on peut obtenir des résultats très intéressants en contrôlant la vitesse de production des gaz et das pétroles.

Etant donné que tous les champs de pétrole finissent par arriver à un stade de pompage où il devient onéreux d'élever le fluide pétrolier à la surface, on a fait de nombreuses études pour arriver à préciser des méthodes de forage et de production à même de réduire au minimum la quantité d'eau pompée du gisement en même temps que le pétrole. Une pénétration minimum de la zone payante ou productrice est un moyen de retarder la circulation de l'eau vers le puits. Par suite, il est sage, dès qu'on a percé un puits commercial, de s'abstenir de forer plus profondément dans la formation payante. Un autre aspect essentiel de ce contrôle est d'éliminer ou de modifier les essais potentiels et d'établir des vitesses d'extraction uniformes et relativement peu élevées. Un troisième élément essentiel du contrôle de l'eau réside dans le maintien d'une pression arrière uniforme à la surface de la zone de production.

Lorsque l'eau trouve moyen de parvenir dans un puits, on peut avoir recours à diverses méthodes pour refouler et arrêter cette eau, mais, en général, on peut dire que ces tentatives de refoulement de l'eau ne sont que des palliatifs temporaires, car si on reprend la production du pétrole, l'eau salée ne manquera pas de faire sa réapparition au fond du puits.

Chacun sait dans l'industrie pétrolière qu'on ne manque jamais de trouver du pétrole au-dessus de l'eau salée dans tout champ pétrolier à même de produire de l'eau. Etant donné, d'autre part, que ce pétrole aura toujours tendance à s'écouler vers le points de la plus basse pression, à savoir le puits de forage, il a été prouvé qu'en pénétrant le moins possible le haut de la formation productrice, on est à même d'extraire à peu près autant de pétrole que par une pénétration plus profonde, mais avec l'avantage que par une pénétration minimum on réduit la production d'eau au minimum aussi. Le pétrole réussit à parvenir au puits, mais l'eau se trouve retenue, de sorte que pour parvenir jusqu'au puits il lui faut déplacer le pétrole qui la sépare du fond du puits; en outre, en procédant de la sorte, l'eau fournit l'énergie nécessaire pour amener le pétrole au puits, et l'on retarde du même coup la progression de l'eau dans la direction du puits.

Le maintien de la pression arrière sur le gisement est encore essentiel par suite du fait que la fluidité de l'eau est environ quatre fois plus grande que celle d'un pétrole moyen, et si cette pression arrière vient à baisser, la rapidité d'écoulement du pétrole se trouve accrue, mais pas à un même degré que la vitesse d'écoulement de l'eau derrière lui.

L'application des principes signalés plus haut se traduira par des avantages pour l'exploitant, le concessionnaire qui touche les redevances, ainsi que l'état intéressé, de sorte qu'il est fort probable que des commissions officielles d'état seront investies par lois du droit de passer des décrets uniformes à appliquer aux champs pétrolifères de l'avenir afin de permettre aux exploitants de régler le mode et la vitesse de production des gaz naturels et des pétroles de manière à obtenir un maximum d'avantages. Il est vraisemblable qu'une surveillance s'imposera pour l'application de cette règlementation, au moyen d'une commission spéciale d'état, à moins que tous les exploitants n'arrivent à s'entendre à exploiter leurs concessions d'une manière uniforme permettant d'obtenir les meilleurs résultats possibles, car une ou deux exceptions à la pratique générale suffiraient à nullifier l'effet des conditions désirées dans le champ entier.

pozo. Por esta razón, es bueno, a continuación de la perforación de un pozo comercial, abstenerse de perforar más profundamente en la formación productiva. Otro aspecto esencial de este control es eliminar o modificar los ensayos potenciales, estableciendo, al mismo tiempo, velocidades de extracción uniformes y relativamente poco elevadas. Un tercer elemento esencial del control del agua se halla en mantener una contrapresión uniforme en la superficie de la zona productiva.

Cuando el agua logra, de alguna manera, meterse en el pozo, se puede entonces recurrir a varios medios para tapar o cerrar esta agua, pero, en términos generales, se puede decir que todos estos esfuerzos para detener el agua son nada más que expedientes temporarios, pues al emprender de nuevo la producción de petróleo, el agua salada no tardará en reaparecer en el fondo del pozo.

Se sabe muy bien en la industria petrolera, que nunca deja de presentarse petróleo arriba del agua salada, en toda formación que se presenta acompañada de formación de agua. Por otra, en vista de que este petróleo tiene siempre la tendencia a pasar al punto de más baja presión, que en este caso es el pozo perforado, se ha visto que penetrando lo menos posible la sección superior de la formación o yacimiento, se puede extraer casi tanto petróleo que mediante una perforación mucho más profunda, y con la ventaja de que la perforación mínima reduce también a un mínimo la producción de agua. El petróleo logra llegar al pozo, pero el agua queda retenida, y para que ella pueda también llegar al pozo, es necesario primeramente desplazar el petróleo que la separa del fondo del pozo. Por otra parte, mediante est procedimiento, el agua suministra la energía necesaria para empujar el petróleo hacia el pozo, y se tiene también la adicional ventaja de que se retarda el avance del agua en la dirección del pozo.

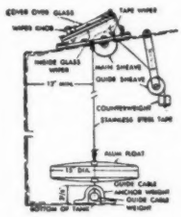
La conservación de la contrapresión sobre el yacimiento es también cosa muy esencial, a causa del hecho de que la fluidez del agua es casi cuatro veces más grande que la promedia del petróleo. Cuando esta contrapresión baja, aumenta entonces la rapidez de la corriente o flujo del petróleo, pero no hasta igualarse a la velocidad del agua que lleva detrás.

La aplicación de los principios señalados aquí se traduce en beneficiosas ventajas para los explotadores, para los concesionarios o dueños del terreno, y para el Estado. Por estas razones, es muy probable que las comisiones oficiales llegarán algún día a facultarse para pasar reglamentos o decretos uniformes, aplicables a campos petrolíferos, a fin de permitir a los explotadores, regular el método y la rapidez de la producción de gases naturales y petróleos, sobre una base de máximas ventajas. Existe, por supuesto, en todas partes, la posibilidad de que se imponga una vigilancia estricta, para la aplicación de esta reglamentación de un modo racional, bajo la dirección de alguna comisión especial nombrada por el estado, para este fín, a menos que todos los explotadores lleguen a algún conveniente acuerdo, en lo tocante a métodos y prácticas de caracter uniforme, que ha de implantarse y seguirse en beneficio de todos, cosa bastante problemática, a causa de que unas pocas empresas, que dejen de adherirse voluntariamente al plan general, será suficiente para desbaratar todo el consorcio.

Oceco Products—have a world-wide reputation

OCECO Type B Vent Unit complete with mounting flange and Oceco Flame Arrestor.

OCECO permanently accurate positive displacement Meter.



OCECO No. 8 Tank Gauge showing assembly and tank mounting

The wide acceptance Oceco equipment enjoys throughout both hemispheres instantly identifies its dependability and utility.

Oceco Vents control tank breathing. They prevent the free circulation of air . . . and protect the tank against excessive pressure and vacuum. Oceco Vents minimize evaporation losses of refined gasoline and lowered gravity of crude oil. They pay for themselves in a few weeks time. Sizes from 2" to 10" —1/4 oz. to 50 lbs. pressure . . . usually furnished complete with mounting flange and Oceco flame arrestor whose world-wide record is:

"NO GAS-TIGHT TANK EQUIPPED WITH AN OCECO FLAME ARRESTOR HAS EVER BEEN LOST BY FIRE."

Oceco Meters operate with permanent and unvarying accuracy. They are unaffected by variations of temperature, viscosity or pressure. Oceco Meters have few moving parts, incur a minimum of wear. They are of rugged construction —and have no levers or delicate mechanisms to get out of order. Sizes to 1000 gallons a minute—each fully calibrated and requiring no further adjustment in the field.

Oceco Tank Gauges permit the taking of accurate tank readings without relieving the pressure in the tank or exposing the gauger to fumes. They are of Oceco's serviceable design and corrosion resisting construction—and are fitted with plate glass window and inside wiper to insure clear vision. More complete details of these and other Oceco products sent on request.

L'accueil dont jouit l'équipement Oceco dans les deux hémisphères atteste immédiatement sa valeur.

Les Events Oceco suppriment l'évaporation des réservoirs. Ils empêchent la libre circulation de l'air et protègent le réservoir contre une pression et un vide excessifs. Les Events Oceco réduisent au minimum les pertes par evaporation de la gazoline raffinee et de la gravité diminuée de l'huile lourde. Après l'emploi de quelques semaines on en a économisé le prix. Grandeurs de 2 à 10 pouces—¼ oz. à 50 lbs. de pression . . . ordinairement fournis avec bride de monture et pare—flamme Oceco dont voici la réputation dans le mondé entier:

"AUCUN RÉSERVOIR ÉTANCHE AUX GAZ MUNI D'UN PARE—FLAMME OCECO A EVENT N'A JAMAIS PRIS FEU."

Les Compteurs Oceco opèrent avec une exactitude permanente et invariable. Les variations de la température, de la viscosité ou de la pression ne les touchent pas. Ayant peu de parties mobiles ils ne s'usent pas facilement. Ils sont d'une construction forte, et n'ont ni leviers ni mécanisme delicat qui pourraient s'abîmer facilement. Grandeurs jusqú à 1000 gallons par minute—chacun bien étalonné et n'ayant besoin d'aucun ajustement dans le champ.

Avec les Vérificateurs de réservoir Oceco on peut faire le relevé des consommations sans diminuer la pression dans le réservoir ou sans exposer le vérificateur aux vapeurs. Sur demande on enverra des détails complets des produits ci-dessus et d'autres produits Oceco.

La buena acogida de que goza el equipo Oceco en los dos hemisferios muestra inmediatamente su valor.

Los Venteos Oceco suprimen la evaporación de los tanques. Impiden la libre circulación del aire y protegen el tanque contra una presión y un vacío excesivos. Los Venteos Oceco reducen al mínimo las pérdidas por evaporación de la gasolina refinada y de la gravidad reducida del aceite bruto. Se puede economizar el precio de este producto usándolo algunas semanas. Tamaños de 2 a 10 pulgadas—¼ oz. a 50 libras de presión . . . ordinariamente librado con brida de montura y detenedor de llama Oceco, que tiene en el mundo entero la reputación siguiente:

"NINGUN TANQUE HERMÉTICO AL GAS CON RESPIRADERO, PROTEGIDO POR EL DETENEDOR DE LLAMA, SE HA PERDIDO JAMÁS A CAUSA DE INCENDIO."

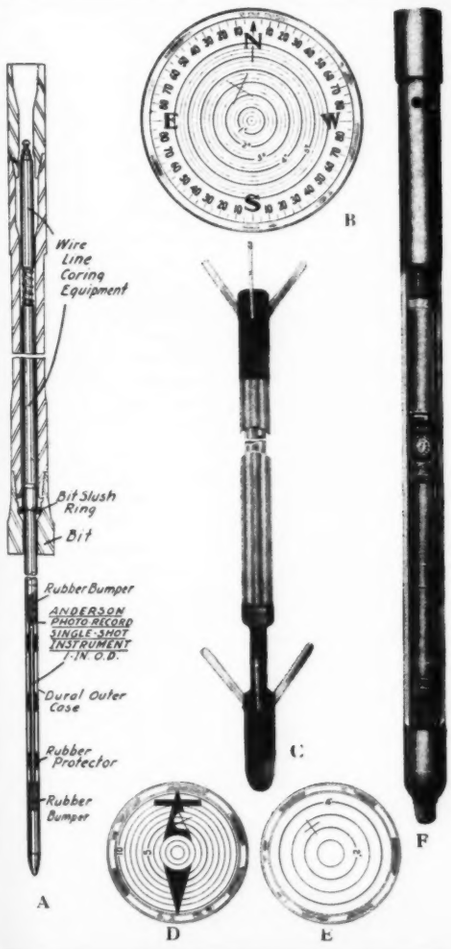
Los Contadores Oceco funciona con una exactitud permanente e invariable. Las variaciones de la temperatura de la viscosidad o de la presión no los afectan. Teniendo pocas partes móviles no deterioran fácilmente. Son de una construcción fuerte y no tienen ni palanca ni mecanismo delicado que pueda hecharse a perder. Tamaños hasta 1000 galones por minuto—cada uno bien verificado y sin necesitar ningún ajustamiento en el campo.

Con los Averiguadores de Tanques Oceco se puede hacer la lectura de los contadores sin bajar la presión en los tanques o sin exponer el verificador a los vapores. Pídase los detalles completos de los productos mencionados aquí y de otros productos Oceco.

Let us send you fully descriptive catalogs, prices, etc.

Specify Oceco Fittings —Your tanks deserve the best.

THE JOHNSTON & JENNINGS CO., *Oceco Division*
884 ADDISON ROAD • CLEVELAND, OHIO



INSTRUMENTS and TOOLS for UNDERGROUND SURVEYS and DIRECTIONAL DRILLING

Accuracy and Ease of Operation are provided by Anderson Instruments and Tools. The Photo-Record Single-Shot Survey Instruments measure both Inclination and Direction in open hole while the well is being drilled. The large size "F" (3¼" O.D.) is run on the sand line and furnishes the Record Disc "B." The smallest size (1¼" O.D.), run on piano wire or used with wire line coring equipment as shown at "A," provides the Record Disc "D" without removing drilling tools from the hole. The Photo-Record Go-Devil "C" (1¼" O.D.) gives inclination readings on Disc "E" when dropped through the drill pipe.

We also have a complete line of Directional Drilling Tools.

See Composite Catalog and send for Complete Details

INSTRUMENTS et OUTILS pour PROSPECTIONS DU SOUS-SOL et FORAGE EN DIRECTION

Les instruments et les outils Anderson se signalent par la précision et l'aisance de manipulation. Les instruments prospecteurs à enregistrement photographique en une seule opération mesurent dans le puits ouvert tant l'inclinaison que la direction au cours du forage. Le fort calibre "F" (3¼ pouces D.E.) est descendu par la conduite à sable et fournit le disque enregistreur "B". Le plus petit calibre (1¼ pouce D.E.), descendu par fil de piano ou employé avec équipement de carottage à câble métallique comme représenté en "A", fournit le disque enregistreur "D" sans devoir sortir les outils de forage du puits. L'enregistrement photographique "C" dit "Go-Devil" (1¼ pouce D. E.) donne les indications d'inclinaison sur le disque "E" lorsqu'on le fait descendre dans le tuyau de forage.

Nous offrons aussi une série complète d'outils de forage en direction.

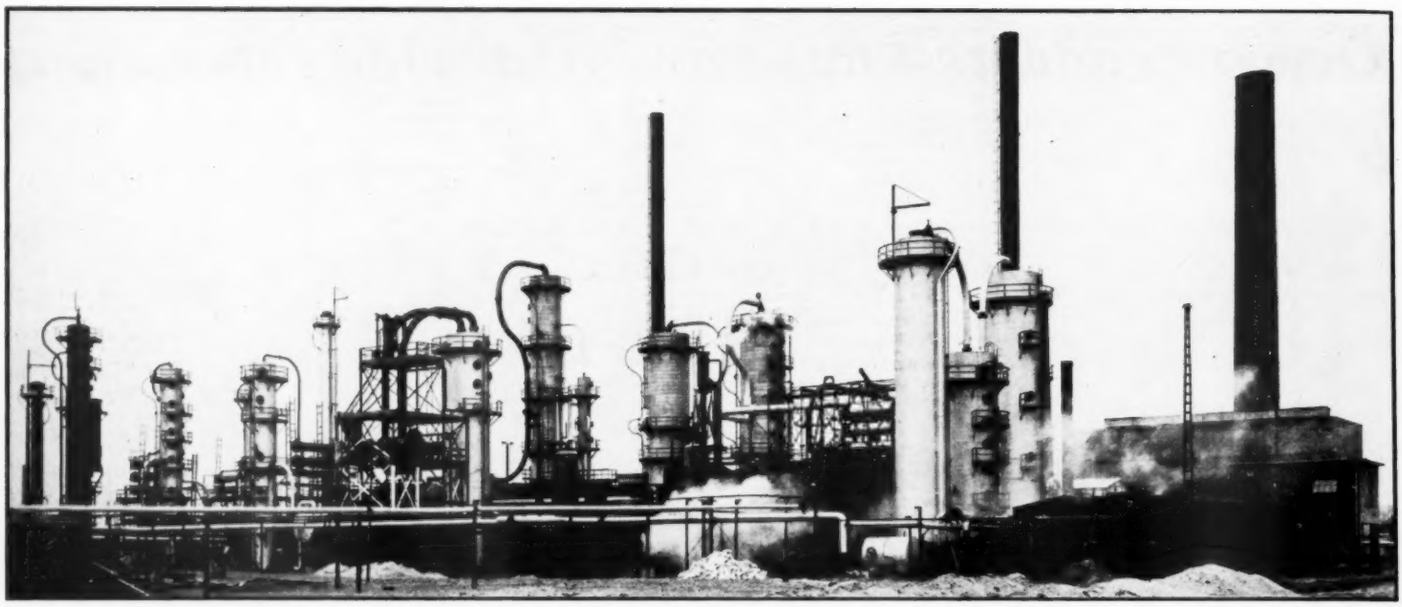
Voir catalogue combiné et demander détails complets.

INSTRUMENTOS Y HERRAMIENTAS PARA RECONOCIMIENTOS SUBTERRANEOS Y PERFORACION DIRECCIONAL

Los instrumentos y las herramientas Anderson se caracterizan por la precisión y la facilidad de su manipulación. Los instrumentos de reconocimiento de registro fotográfico, de tipo de una sola operación, miden en los pozos abiertos, tanto la inclinación como la dirección durante la perforación. El tamaño grande (de 3¼" de diámetro exterior) se hace descender por el conducto de arena y suministra el disco registrador "B". El de tamaño más pequeño (de 1¼" de diámetro exterior) se hace descender con alambre de piano o se emplea con el equipo de sacar muestra accionado por cable metálico, como se representa en A, y suministra el disco registrador "D", sin necesidad de quitar los útiles de perforación del pozo. El registro fotográfico, llamado "Go-Devil", señalado por la "C" (de 1¼" de diámetro exterior) da las indicaciones de inclinación sobre el disco "E", mientras va descendiendo por el tubo de perforación.
Ofrecemos también un surtido completo de herramientas de perforación direccional.

Sírvase ver el catálogo combinado y pedirnos detalles completos.

ALEXANDER ANDERSON, INC.
FULLERTON, CALIFORNIA, U. S. A.
Direction Control of Drilling Wells • *Surveyors of Oil Wells Since 1924*



Petroleum Refining

PRIMARY DISTILLATION

Refiners are interested in dehydrating or desalting equipments to avoid overheating of still bottoms and tubes by salt deposits, and to avoid excessive acid corrosion. The salt is effectively removed from some crude oils by washing with water.

The use of centrifugal pumps and electric power is increasing. One refiner uses electric power exclusively and has no boiler-plant. The adoption of centrifugal pumps has been hindered in the past by using them for services for which they were unsuited. Highly efficient centrifugal pumps for high-pressure service are now available.

Open-type coil condensers and coolers are being adopted by the refining industry although they have been used for several years in natural gasoline plants. These condensers consist of pipe coils or large tube bundles suspended over a water pit. Cooling water is sprayed over the coil. The open-type condensers are also built in conjunction with cooling towers. The main advantage of these condensers is the ease with which they can be cleaned.

In distillation plants the tendency is toward a larger use of heat-exchange and the utilization of heat from one unit in heating the charge stock for another. Efforts to develop more efficient fractionating towers or devices are attracting attention. An efficient perforated type of plate is used in several gas absorption plants and a centrifugal fractionator said to be equivalent to several hundred ordinary bubble-plates has been developed. Bubble-towers must be tall to permit adequate separation of vapor and liquid on each plate whereas the centrifugal fractionator maintains a separation of liquid and vapor in a height that is a fraction of an inch because of centrifugal force. The force that may be maintained is many times the force of gravity.

Pipestills are built for even more radiant heat absorption than before. The shape of the furnace cavity is receiving particular attention with the result that ineffective surfaces are being avoided and uniform heating conditions are maintained. Many stills have four of the six walls covered with cooling surface. In large stills the convection section is built in the center and inside of the radiant section so the flames on each side of the convection section pass upward and down into the convection section. The use of many small burners

Raffinage de Petrole

DISTILLATION PRIMAIRE

Les raffineurs sont intéressés au matérial à deshydrater et à dessaler, et cela afin d'éviter l'échauffement des fonds d'alambics et des tubes d'alambics par suite d'accumulation de sel, et aussi pour éviter la corrosion excessive par les acides. Certains pétroles se prêtent à l'élimination du sel à l'état brut par un simple lavage à l'eau.

L'emploi des pompes centrifuges et de la force électrique est de plus en plus répandu. Un important raffineur emploie la force électrique exclusivement et se passe ainsi d'installation de chaudières. Dans le passé, la diffusion de l'emploi des pompes centrifuges a été retardée par suite du fait qu'on l'a trop souvent employée à des services qui ne lui convenaient pas. On trouve maintenant sur le marché des pompes centrifuges de grande efficacité qui sont prévues pour service sous haute pression.

Les raffineries adoptent de plus en plus les condenseurs à serpentins et refroidisseurs à serpentins du type ouvert, bien que leur emploi était déjà courant depuis plusieurs années parmi les distilleries d'essence naturelle. Ces condenseurs consistent de serpentins tubulaires ou grands faisceaux de tubes suspendus au-dessus d'une fosse à eau. Le serpentin est aspergé d'eau de refroidissement. Les condenseurs du type ouvert sont aussi construits pour emploi sur les tours de refroidissement. L'avantage principal de ces condenseurs réside dans la facilité avec laquelle on peut les nettoyer.

Dans les ateliers de distillation, on a tendance à faire un usage plus fréquent des échangeurs de chaleur et à utiliser la chaleur émanant d'un groupe pour chauffer la charge pétrolière d'un autre. L'attention se concentre aussi sur la mise au point de tours de distillation fractionnée d'un plus grande efficacité, et des dispositifs accessoires. Dans plusieurs installations d'absorption de gaz, on a employé avec succès une plaque du type perforcé, et l'on annonce par ailleurs l'emploi d'un distillateur fractionné centrifuge dont le rendement serait plusieurs centaines de fois celui d'une plaque de barbotage ordinaire. Les tours de barbotage doivent nécessairement être hautes pour permettre une séparation efficace des vapeurs et des liquides sur chaque plaque, tandis que le distillateur fractionné centrifuge effectue cette séparation de vapeurs et liquides dans une hauteur qui représente

Refinacion del Petroleo

DESTILACION PRIMARIA

Los refinadores están interesados en equipos de deshidratar y desalar, para evitar el recalentamiento de los fondos y tubos de los alambiques, debido a la acumulación de sal, y para evitar también la excesiva corrosión por ácido. La sal se quita ahora efectivamente de ciertos petróleos lavándolos con agua.

Está aumentando la utilización de las bombas centrífugas y fuerza eléctrica. Un importante refinador emplea exclusivamente fuerza eléctrica, sin ninguna instalación de calderas. A causa de que se han dedicado a servicios para los cuales no eran adecuadas, las bombas centrífugas no han tenido, hasta ahora, aceptación general. Actualmente hay bombas centrífugas de alta presión, que resultan muy satisfactorias en determinadas aplicaciones.

Las refinerías están adoptando condensadores de serpentín de tipo abierto y enfriadores. Estos equipos, sin embargo, se han venido usando, desde hace años, por las destilerías de gasolina natural. Estos condensadores consisten en serpentines tubulares o grupos de tubos grandes, suspendidos sobre un hoyo de agua. Sobre estos tubos se rocía agua de enfriamiento. Los condensadores de tipo abierto se construyen también en combinación con torres de enfriamiento. La ventaja principal de estos condensadores está en la facilidad con que se puedan limpiar.

En las destilerías se presenta la tendencia hacia un mayor aprovechamiento del cambio o transferencia de calor, es decir, la utilización del calor de una unidad en el calentamiento de la carga de petróleo de otra unidad. Los esfuerzos por desarrollar torres u otros aparatos más eficaces para la destilación fraccionada, están despertando creciente interes. En varias plantas de absorción de gas se está empleando una eficaz placa de tipo perforado, y se ha desarrollado también un fraccionador centrífugo, que se dice es equivalente a varios centenares de placas de burbujeo ordinarias. Las torres de burbujeo deben ser altas para facilitar una adecuada separación del vapor y líquido, en cada placa, mientras que el fraccionador centrífugo mantiene una separación de líquido y vapor en una altura que es una fracción de una pulgada, debido a la fuerza centrífuga. La

White Model 643-SD-452, typical of the super-heavy duty White trucks used in world-wide oil field service.

Modèle White 643-SD-452, exemple typique des camions White de service extra-dur utilisés en service pétrolier dans le monde entier.

Modelo White 643-SD-452, ejemplo típico de los camiones White de servicio muy pesado utilizados en servicio petrolero en todas partes del mundo.

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● Under the worst oil field operating conditions in every part of the world, White Trucks have made outstanding records for dependability and low operating costs.

No matter what the requirement is, the right truck for every need of petroleum production and marketing can be found in the complete White line. There is a wide range of capacities running from 1½-ton to super-heavy duty units, four and six wheelers, with single or dual drive rear axles. Both gasoline and diesel engines are available.

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● Dans les conditions d'exploitation pétrolière les plus défavorables, sur les chantiers de toutes les parties du monde, les camions White se sont acquis des records remarquables pour la régularité en service et le coût d'exploitation réduit.

Quel que soit l'emploi qu'on lui réserve, l'assortiment complet White a le camion répondant exactement aux besoins divers de la production et de la vente du pétrole. Il est prévu une vaste gamme de capacités, depuis les modèles de 1½ tonne jusqu'aux modèles de service extra-dur, types à quatre et à six roues, avec pont-arrière à commande simple ou double. On a prévu la fourniture de moteurs Diesel ou de moteurs à essence.

Outre son expérience de 36 ans dans l'étude des besoins des exploitants de champs pétroliers dans le monde entier, White offre des facilités de service d'étendue mondiale.

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● Bajo las más desfavorables condiciones de explotación petrolera, en todas partes del mundo, los camiones White han establecido sobresalientes precedentes en materia de seguridad en funcionamiento y economía en conservación general.

Para cualquier servicio que se necesite, hay en el surtido White un camión que responde exactamente a las diversas necesidades de la producción y de la venta de petróleo. Hay, en efecto, una amplia escala de capacidades, desde los modelos de 1½ tonelada, hasta los modelos de servicio muy pesado, tipos de cuatro o de seis ruedas, con eje trasero de propulsión sencilla o de propulsión doble. Se ofrecen también con motores diésel o con motores de gasolina.

En adición a 36 años de experiencia en satisfacer los requisitos de los explotadores de campos petrolíferos, en todas partes del mundo, la compañía White ofrece facilidades de servicio de conservación de caracter internacional.

A solicitud suministraremos características detalladas y precios. Sírvase indicarnos sus requisitos por carta o por telegrama.

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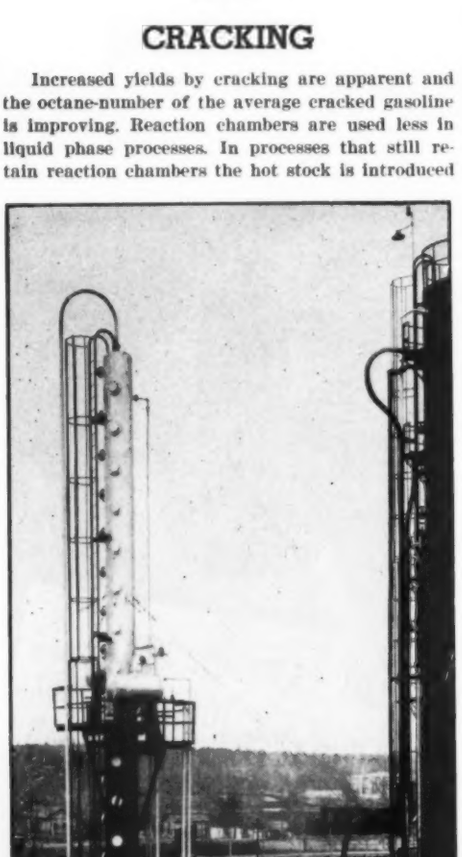
rather than a few large burners is proving effective in giving uniform heating conditions in the radiant section. The use of two or more coils in a single pipestill-setting is becoming increasingly common.

CRACKING

Increased yields by cracking are apparent and the octane-number of the average cracked gasoline is improving. Reaction chambers are used less in liquid phase processes. In processes that still retain reaction chambers the hot stock is introduced



Gasoline recovery plant

into the top of the chamber so the liquid drops to the bottom and is quickly removed and cooled but the vapor is held in the chamber for a longer time than formerly.

Viscosity breaking of straightrun fuel oils is being conducted more and more extensively in the cracking processes themselves or in conjunction with them rather than as independent operations. In fact nearly all fuel oil is now being cracked because of increasing demand for antiknock fuels. This demand will increase sharply due to increased automotive registration and even higher octane-number fuels. The most effective way to increase cracking yields is to degrade or reduce the cracked fuel oil to a lower gravity and, in so doing, refiners are finding it necessary to practice viscosity breaking.

An increasing number of two-coil cracking plants, in which the lighter stocks such as distillate and naphtha (or straight gasoline) are cracked in one coil and the heavier stocks in another coil, are being built. The use of two coils is somewhat equivalent to enlarging the usual reforming coil so it handles not only straightrun gasoline but also the lighter distillate materials

une fraction d'un pouce, et cela grâce à la mise en jeu de la force centrifuge. La force qu'on peut ainsi maintenir est de nombreuses fois plus forte que celle de gravité.

Les alambics tubulaires des modèles les plus récents ont un pouvoir d'absorption de chaleur de radiation encore plus élevé que jusqu'ici. On a tout spécialement étudié la forme de la cavité du foyer, de sorte qu'on a réussi à éliminer les surfaces inefficaces et à obtenir des conditions assurant une chauffe uniforme. Un bon nombre des alambics ont quatre sur six de leurs parois pourvues d'un revêtement à surface de refroidissement. Dans les grands alambics, la section de diffusion de la chaleur est construite au centre et à l'intérieur de la section de radiation, de sorte que les flammes de part et d'autre de la section de diffusion par en haut et par en bas. L'emploi d'un grand nombre de petits brûleurs, de préférence à un petit nombre de grands brûleurs, s'est montré efficace, pour établir des conditions de chauffe uniforme dans la section de radiation de la chaleur. De plus en plus répandu aussi est l'emploi de deux serpentins ou plus dans chaque installation d'alambic tubulaire.

PROCEDE DU CRACKING

Par l'emploi du procédé dit du cracking, on obtient de meilleurs rendements et l'indice octane de l'essence crackée moyenne se trouve amélioré. On a moins souvent recours aux chambres re réaction dans les procédés à phases liquides. Dans les cas ou l'on continue à employer les chambres de réaction, les huiles chaudes à traiter sont introduites dans la chambre par le haut de sorte que le liquide tombe de lui-même à la partie inférieure où il est promptement entraîné et refrodi, mais par ce procédé les vapeurs séjournent plus longtemps dans la chambre qu'autrefois.

Le fractionnement de la viscosité des huiles combustibles tout venant se pratique de plus en plus fréquemment au cours des opérations de cracking elles-mêmes ou en rapport étroit avec elles, au lieu d'en faire l'objet d'opérations indépendantes. En fait, presque toutes les huiles combustibles sont maintenant soumises au cracking, par suite de la demande croissante en carburants anti-détonants. D'ailleurs, cette demande est appelée à augmenter très fortement à cause du nombre croissant des automobiles en circulation et de l'emploi de plus en plus répandu des carburants à indice octane élevé. Le moyen le plus officace pour améliorer les rendements du cracking consiste à abaisser ou à réduire la densité de l'huile combustible crackée, et, à cette fin, les raffineurs ont été amenés à pratiquer le fractionnement de la viscosité.

On préconise de plus en plus les installations de cracking à deux serpentins, dans lesquelles les huiles légères, notamment les distillatums et les naphtes (ou essence tout venant), sont crackées dans un serpentin, alors que les huiles lourdes sont crackées dans l'autre. On peut dire que l'emploi de deux serpentins revient dans une certaine mesure au même que si on élargissait le serpentin réformateur habituel, afin qu'il se charge non seulement de l'essence tout venant, mais aussi des produits de distillation plus légers qui sont normalement présents dans les huiles soumises à un deuxième cycle de traitements dans les ateliers de cracking.

L'introduction de deux serpentins dans un groupe unique d'alambic tubulaire a conduit à l'elaboration d'une théorie de la construction des alambics tubulaires. On a donc tendu à réaliser une surface de chauffe plus rationnelle, conçue telle que toute la surface de radiation soit chauffée uniformément. En même temps, on a eu recours à des systèmes à brûleurs multiples aux fins d'assurer une répartition uniforme des flammes. En outre, on a eu bien soin d'éviter les coudes brusques dans le sens emprunté par

fuerza que puede mantenerse es muchas veces mayor que la fuerza de gravedad.

Los alambiques tubulares más recientes ofrecen mayor absorción de calor de radiación que antes. La forma de la cavidad del hogar está recibiendo particular atención, con el resultado de que se están evitando las superficies inefectivas y manteniendo uniformes condiciones de calentamiento. Muchos alambiques tienen cuatro de las seis paredes o tabiques cubiertos con superficie de enfriamiento. En los alambiques más grandes, la sección de difusión del calor se construye en el centro y dentro de la sección de radicación, para que las llamas en cada lado de la sección de difusión entren en ésta por arriba y por abajo. El empleo de muchos quemadores pequeños, en lugar de unos pocos quemadores grandes, está resultando efectivo en establecer uniformes condiciones de calentamiento en la sección de radiación de calor. Está generalizándose también el empleo de dos o más serpentines en cada instalación de alambique tubular.

PROCEDIMIENTO "CRACKING"

El procedimiento "cracking" produce mayores rendimientos y se está mejorando el número de octano de la gasolina destilada por este procedimiento. Se emplean menos cámaras de reacción en los procedimientos de fase líquida. En los procedimientos que todavía retienen cámaras de reacción, el petróleo crudo caliente se introduce en la parte superior de la cámara: el líquido cae al fondo y se quita y enfría rápidamente, pero el vapor permanece durante más tiempo que antes, en la cámara.

La separación de viscosidad de los petróleos de primera destilación se está efectuando, con creciente aceptación, simultáneamente con los mismos procedimientos de "cracking" o en combinación con ellos, en lugar de someterse a métodos independientes. En realidad, casi todos los petróleos o aceites combustibles se someten ahora al procedimiento de "cracking" debido a la creciente demanda de combustibles antidetonantes. Esta demanda aumentará mucho, a causa de la creciente matrícula de automóviles y consumo de combustibles de mayor valor octánico. La manera más efectiva de aumentar el rendimiento, por el procedimiento "cracking" es rebajar o reducir el petróleo a un menor grado de densidad o peso específico, y para la realización de esto, los refinadores se ven obligados a recurrir a la separación de viscosidad.

Se está construyendo un creciente número de instalaciones de "cracking" de dos serpentines. En uno de los serpentines se destilan los productos más livianos o volátiles, como la nafta o la gasolina corriente, y en el otro, los productos más pesados o viscosos. El empleo de dos serpentines equivale, más o menos, a amplificar el corriente serpentín de reformación, de modo que sirve no sólo para el manejo de la gasolina corriente, sino también para los destilados más livianos, que normalmente se presentan en el ciclo de destilación del procedimiento "cracking."

El empleo de dos serpentines en un solo alambique tubular ha requerido una revisión de la teoría de construcción de alambiques para este fín. La tendencia ha sido hacia disponer la superficie de calentamiento con mayor cuidado, para que toda la superficie de radiación se caliente de un modo uniforme. Al mismo tiempo, se han empleado múltiples sistemas de quemadores, para asegurar uniformes condiciones de llama. Se han suprimido los ángulos o vueltas agudas, en la dirección de la corriente de los gases calientes de los tubos, en los modelos más recientes, con el resultado de que se han corregido el tropiezo de la llama y el recalentamiento seccional o local. En un nuevo tipo de hogar, las llamas y los gases de combustión pasan hacia arriba por un angosto conducto en ambos

McCORD LUBRICATORS

Standard Lubricators of the Oil Field

THE McCORD "LD" LUBRICATOR

DEPENDABLE—ACCESSIBLE—ECONOMICAL

The McCord Class "LD" Lubricator is the only one of the two plunger sight feed type that shows the oil is actually being delivered to the cylinder or part being lubricated. This is an exclusive McCord safety feature which definitely shows at all times that the lubricator is functioning properly. In the McCord Class "LD" after the oil has passed through the sight feed glass, undetected leakage is impossible, an additional safeguard that makes for dependable service.

The performance of McCord "LD" Force Feed Lubricators meets the most exacting requirements of lubricator service. Pump units can be adjusted to deliver varying quantities of oil from a fraction of a drop to a constant stream, and at any and all speeds. The ability to deliver minute quantities of oil against extremely high pressure is an inbuilt characteristic of McCord Lubricators. The adjustment of the pump units once made remains unchanged, even extreme changes in temperatures have no effect on the adjustment. The same quantity of oil is delivered when using a light oil as when using a heavy cylinder oil. Every McCord pump unit is tested against 2000 pounds pressure. A hand crank opposite the driving mechanism permits flushing the parts to be lubricated with oil before starting. It may also be used to accelerate the feed, while the lubricator is in operation, in case of emergency. A large filler cap is used permitting ease and rapidity of filling. A drain plug is fitted, at the bottom of reservoir. A gauge glass shows the oil level in the reservoir, and where desirable, lubricators can be furnished with two compartments for delivering different kinds of oil.

Reservoir capacities 1 qt. to 4 gal. Feeds 1 to 24—30 Standard sizes.

Catalog and Price List on Request.

McCORD CLASS "SF" LIQUID SIGHT FEED LUBRICATOR

1. Positive Oil Delivery at all Times.

McCord Class "SF" Lubricators have been designed to deliver oil at frequent and regular intervals, in a predetermined charge sufficiently large to maintain the oil film on moving surfaces.

2. Rugged Pump Construction.

McCord pump units are simple, sturdy and accurate, positive in operation and independently mounted. McCord pump units are the most accurate and efficient known.

3. Flexibility of Oil Delivery.

McCord Class "SF" Mechanical Lubricators have the most flexible and accurate oil delivery known. It is not necessary to disassemble any part of a McCord Class "SF" lubricator in order to make adjustments.

4. Removable Pump Units.

Any pump unit may be removed on the McCord Class "SF" Lubricator without stopping the lubricator, nor in any way interfering with its operation.

5. Adaptability to Source of Power.

Eighteen types of drive are provided on the McCord Class "SF". A McCord Class "SF" Lubricator may be placed anywhere, either directly on the machine or remote from it, according to the requirements of the job.

6. Taper Nozzle Gives Accurate Oil Delivery.

The size of the oil drop leaving the tapered sight-feed nozzle is approximately one gravity drop, the universal standard for measuring lubricants. The nozzle is readily removable giving access to the sight feed check ball.

THE McCORD TYPE "C" CHEMICAL MEASURING PUMP

The design of this McCord pump incorporates these important features:

(1) The ability to deliver a predetermined amount of liquid, proportioned according to the requirements, over a definite period of time, or a measured quantity, according to speed of the operating machine.
(2) Second only to accuracy is dependability and all units of the McCord pump are designed with long life and durability—an important consideration.
(3) Individual removable pump units make for easy adjustment, for quick removal for cleaning.
(4) All working parts are completely enclosed, operating in oil, fully protected from dust, dirt and the elements.
(5) The McCord design insures positive delivery of liquids even against pressure as high as 2,000 lbs.
(6) McCord engineering is further evident in the fact that the driving mechanism can be readily removed by taking out four bolts, providing it is desired to change to rotary or ratchet drive.

Accuracy of delivery is possible because of the finely engineered design with a minimum number of parts, carefully machined to McCord's close standards. All working parts are enclosed, fully protected from dust, dirt and the elements.

When used for the delivery or injection of chemicals into crude oil lines an auxiliary chemical tank, made of terneplate, of three-gallon capacity is provided. This tank is connected to the suction side of the pump. For this service pump units, made of steel, are used. (Pump units made of other alloys can be supplied.)

CAPACITY

The ½-inch plunger model delivers one pint of liquid in 261 plunger movements. The ⅛-inch plunger model delivers one pint of liquid in 464 plunger movements, while the ¼-inch plunger model delivers one pint in 167 plunger movements. Catalog on request.

LE GRAISSEUR McCORD "LD"

REGULIER—ACCESSIBLE—ECONOMIQUE

Le graisseur McCord Classe "LD" est le seul du type à débit visible et à deux plongeurs qui permet de suivre la goutte d'huile jusqu'à son arrivée au point du cylindre ou de toute autre pièce à lubréfier. C'est là un dispositif de sûreté exclusif à McCord qui permet de s'assurer en tout temps que le graisseur fonctionne bien. Dans le graisseur McCord de Classe "LD", après que l'huile a passé à travers la vitre à débit visible, une fuite ne peut manquer d'être remarquée, un avantage en plus qui assure un service de tout repos.

Le fonctionnement des graisseurs McCord "LD" à débit visible répond aux exigences les plus dures de service de graissage. Les groupes de pompe peuvent être réglés de façon à faire varier le débit de l'huile depuis une fraction de goutte jusqu'à un jet continu, et cela à toute vitesse désirée. La faculté de débiter des quantités infimes d'huile en présence de pression très élevées est une caractéristique inhérente aux graisseurs McCord. Une fois le réglage des groupes de pompe effectué, il ne se dérange plus, et même les changements extrêmes de températures n'ont pas d'effet sur ce réglage. La même quantité d'huile est débitée lorsqu'on fait usage d'une huile légère tout comme lorsqu'on emploie une huile lourde de cylindres. Chaque groupe de pompe McCord est éprouvé en présence d'une pression de 2000 lbs. Une manivelle prévue en face du mécanisme de commande permet de noyer les pièces à lubréfier dans l'huile avant la mise en marche. On peut aussi employer cette manivelle pour accélérer le débit une fois le graisseur en service, dans les cas de nécessité. Il est prévu un gros chapeau de remplisseur qui permet d'effectuer le remplissage rapidement et facilement. Un bouchon de drainage est prévue à la base du réservoir. Un verre de jauge montre le niveau de l'huile dans le réservoir, et quand on le désire, les graisseurs peuvent être fournis avec deux compartiments afin de débiter différentes sortes d'huiles.

Capacités de réservoir: 1 quart à 4 gallons. Débits 1 à 24—30 grandeurs standard.

Catalogue et tarif sur demande.

GRAISSEUR LIQUIDE McCORD DE CLASSE "SF" A DEBIT VISIBLE

1. Débit positif d'huile en tout temps.

Les graisseurs McCord de Classe "SF" ont été conçus pour débiter l'huile à des intervalles réguliers et fréquents, avec une charge déterminée à l'avance et assez forte pour maintenir une pellicule d'huile sur les surfaces en mouvement.

2. Robustesse de construction des pompes.

Les groupes de pompe McCord sont simples, robustes et précis, de fonctionnement positif et de montage indépendant. Les groupes de pompe McCord sont les plus précis et les plus efficaces que l'on connaisse.

3. Souplesse du débit d'huile.

Les graisseurs mécaniques McCord de Classe "SF" ont le débit d'huile les plus souple et le plus précis qu'on connaisse. Il est pas nécessaire de démonter aucune pièce du graisseur McCord de Classe "SF" pour procéder à des réglages.

4. Groupes de pompe amovibles.

Sur le graisseur McCord de classe "SF", on peut démonter tout groupe de pompe sans devoir arrêter le graisseur, ni devoir en aucune façon gêner son bon fonctionnement.

5. Adaptabilité à la source de force motrice

Il est prévue dix-huit types de commande sur le graisseur McCord de Classe "SF". On peut monter un graisseur McCord de Classe "SF" n'importe où, soit directement sur la machine, soit à distance, selon les conditions imposées par le travil dont il s'agit.

6. Buse conique assurant un débit d'huile précis.

La grosseur de la goutte d'huile qui tombe de la buse conique de débit visible est environ une goutte de gravité, l'étalon de mesure universel pour les lubréfiants. La buse se démonte facilement, ce qui donne accès à la bille d'arrêt de débit visible.

LA POMPE DE DOSAGE CHIMIQUE McCORD DE TYPE "C"

La construction de cette pompe McCord comprend les importantes caractéristiques suivantes:

(1) La faculté de débiter une quantité fixée à l'avance de liquide, dosée d'après les besoins, pendant une période donnée de temps, ou une quantité réglée d'après la vitesse de la machine en marche.
(2) Après la précision vient la régularité, et toutes les unités de la pompe McCord sont prévues pour un maximum de longévité et de durabilité—un élément essentiel.
(3) Des unités de pompe individuelles et démontables qui permettent un réglage facile et un démontage rapide pour le nettoyage.
(4) Toutes les pièces mobiles sont complètement enfermées, fonctionnant dans l'huile, entièrement à l'abri de la poussière, des impuretés et des éléments.
(5) La construction McCord assure un débit positif des liquides, même en présence de pressions allant jusqu'à 2.000 lbs.
(6) La supériorité de la technique McCord est encore mise en évidence par le fait que le mécanisme de commande peut facilement s'extraire en enlevant quatre boulons, à condition que l'on désire passer à la commande rotative ou à rochet.

La précision du débit d'huile est rendu possible grâce à la construction soigneusement étudiée avec un minimum de pièces, usinées avec le plus grand soin selon les standards rigides de McCord. Toutes les pièces mobiles sont enfermées, complètement à l'abri de la poussière, des impuretés et des éléments.

Lorsqu'on emploie ces graisseurs pour débiter ou injecter des produits chimiques dans des conduites de pétrole brut, il est prévu un réservoir chimique auxiliaire, en tôle plombée, d'une contenance de trois gallons. Ce réservoir est relié au côté d'aspiration de la pompe. Pour cet emploi, on fait usage d'unités de pompe en acier. (On peut aussi faire la fourniture d'unités de pompe en autres alliages).

DEBIT

Le modèle à plongeur de ½ pouce débite une pinte de liquide en 261 mouvements du plongeur. Le modèle à plongeur de ⅜ de pouce débite une pinte de liquide en 464 mouvements du plongeur, alors que le modèle à plongeur de ¼ de pouce débite une pinte en 167 mouvements de plongeur. Catalogue sur demande.

EL LUBRICADOR McCORD "LD" SEGURO—ACCESIBLE—ECONOMICO

El lubricador McCord, de clase "LD" es el único tipo de alimentación visible, de dos émbolos, que permite seguir con la vista la gota aceite hasta que lleva al punto del cilindro o de cualquier otra parte, que ha de recibirla para su lubricación. Esto constituye un rasgo de seguridad exclusivo del lubricador McCord, que permite asegurarse, en cualquier momento, de que el lubricador está funcionando bien. En el lubricador McCord, después de que el aceite ha pasado por el vidrio de alimentación visible, el escape nunca puede pasar sin ser observado, lo que estuna adicional ventaja de seguridad de correcto servicio.

El funcionamiento de los lubricadores McCord "LD" de alimentación visible responde a los requisitos más exigentes en servicio de lubricación. Los grupos de bombas pueden regularse para variar la alimentación del aceite desde una fracción de gota hasta un chorro continuo y todo esto a la velocidad que se quiera. La facultad de poder alimentar una mínima cantidad de aceite en presencia de presiones bien elevadas es una característica inherente de los lubricadores McCord. Después de regulado el grupo de bombas, la alimentación fijada no puede alterarse. Aun los más violentos cambios de temperatura no tienen ningún efecto sobre la regulación de la lubricación fijada. Se alimenta siempre la misma cantidad de lubricante, ya se trate de un aceite liviano o de un aceite pesado de cilindros. Cada bomba del grupo de bombas McCord se ensaya bajo una presión de 2000 libras. Una manivela al frente del mecanismo propulsor permite inyectar libremente aceite en las piezas por lubricarse, antes de que se ponga en acción normal el lubricador. Esta misma manivela puede emplearse para aumentar o acelerar la alimentación durante el mismo funcionamiento del lubricador, en caso de necesidad. Está provisto de un henchidor grande, para rellenarlo con facilidad y rapidez. Al fondo del recipiente hay un tapón de evacuación. Un tubo de vidrio indica en todo momento el nivel del lubricante en el receptáculo. Estos lubricadores pueden también suministrarse, cuando así se pidan, con dos receptáculos de lubricantes, para la alimentación de dos clases de aceite.

Capacidades del recipiente, de 1 cuarto de galón a 4 galones. Alimentaciones de 1 a 24-30 de tamaños normales.

A solicitud enviaremos catálogo y lista de precios.

LUBRICADOR LIQUIDO McCORD DE CLASE "SF" DE ALIMENTACION VISIBLE

1. Alimentación positiva de aceite en todo momento.

Los lubricadores McCord de clase "SF" han sido proyectados especialmente para alimentar aceite a intervalos regulares y frecuentes, con una carga determinada de antemano bastante grande para mantener una película de aceite sobre las superficies en movimiento.

2. Bombas de construcción bien firme.

Los grupos de bombas McCord son sencillos, firmes y precisos, de funcionamiento positivo y de montaje independiente. Los grupos de bombas McCord son los más eficaces del mercado.

3. Flexibilidad de la alimentación de aceite.

Los lubricadores mecánicos McCord de clase "SF" tienen la alimentación de aceite más flexible y más precisa que se conoce en la industria. No hay necesidad de desmontar ninguna pieza del lubricador McCord de clase "SF" para efectuar su regulación.

4. Grupos de bombas amovibles.

Del lubricador McCord de clase "SF" se puede desmontar cualquier grupo de bomba sin tener que parar el lubricador o sin que esto separación afecte de alguna manera su buen funcionamiento.

5. Adaptabilidad a la fuente de fuerza motriz.

Para los lubricadores McCord de clase "SF" se han provisto diez y ocho tipos de propulsión o mando. El lubricador McCord de clase "SF" puede instalarse en cualquier punto, ya sobre la misma máquina, ya a distancia de ella, según las condiciones del trabajo que se presente.

6. Boquilla cónica para asegurar una precisa alimentación.

El tamaño de la gota de aceite que cae de la boquilla cónica de alimentación visible es alrededor de una gota de gravedad, que es la medida universal para los lubricantes. La boquilla o surtidor puede desmontarse con facilidad, permitiendo inmediato acceso a la válvula esferica de retención de la alimentación visible.

LA BOMBA DE DOSIFICACION QUIMICA McCORD DE TIPO "C"

La construcción de esta bomba McCord comprende las importantes características siguientes:

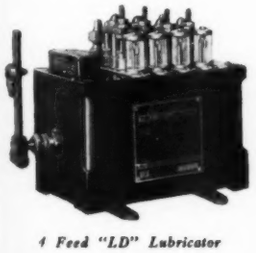
(1) La facultad de alimentar una cantidad fijada de antemano de líquido, dosificada según las necesidades del caso, durante un período dado de tiempo, o una cantidad regulada de acuerdo con la velocidad de la máquina en marcha.
(2) A continuación de la precisión viene la seguridad. Todas las piezas de la bomba McCord se hacen de modo que rindan mucho tiempo de servicio práctico, lo que es un elemento esencial.
(3) El fácil desmontaje de todas las piezas de la bomba McCord permite un ajuste rápido y preciso y una limpieza completa.
(4) Todas las piezas móviles están completamente encerradas, funcionando en aceite, completamente protegidas contra el polvo, tierra y los elementos naturales.
(5) La construcción McCord asegura una alimentación positiva de líquidos, aun en presencia de presiones hasta de 2.000 libras.
(6) La superioridad técnica de la bomba McCord se pone una vez más de evidencia mediante el hecho de que el mecanismo de propulsión puede extraerse con facilidad quitando sencillamente cuatro pernos, en el caso en que se desee pasar a propulsión rotativa o de trinquete.

La precisión de la alimentación de aceite se debe fundamentalmente a la construcción esmeradamente estudiada con un mínimo número de piezas, todas labradas a máquina con sumo cuidado, de acuerdo con las rígidas normas de todo producto McCord. Todas las piezas móviles están encerradas, completamente protegidas contra el polvo, tierra y los elementos.

Cuando se emplean estas bombas para alimentar o inyectar productos químicos en los conductos de petróleo crudo, se proveen de un depósito químico auxiliar, de lámina con revestimiento de plomo, con cabida para tres galones. Este depósito se une al lado de aspiración de la bomba. Para este servicio se emplean bombas de acero. (También podemos suministrar unidades de bombas de especiales aleaciones de acero.)

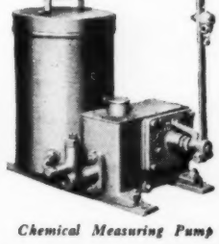
CAPACIDAD

El modelo de émbolo de ½ pulgada alimenta una pinta (como un litro) de líquido en 261 movimientos de émbolo. El modelo de ⅛ de pulgada alimenta una pinta de líquido en 464 movimientos de émbolo, y el modelo de ¼ de pulgada alimenta una pinta en 167 movimientos de émbolo. Catálogo a solicitud.



4 Feed "LD" Lubricator

Eleven Feed Internal Ratchet Drive



Chemical Measuring Pump

Other McCord Products: Metallic Asbestos Gaskets; Engine Cooling Radiators; Unit Heaters.

McCORD RADIATOR & MFG. CO., DETROIT, U.S.A.

SHAFFER Portable Drilling Equipment

SHAFFER PORTABLE ROTARY DUAL OR TRIPLE ENGINE DRIVE FOR GAS-GASOLINE OR DIESEL ENGINES

PORTABLE
DURABLE
FLEXIBLE
ECONOMICAL

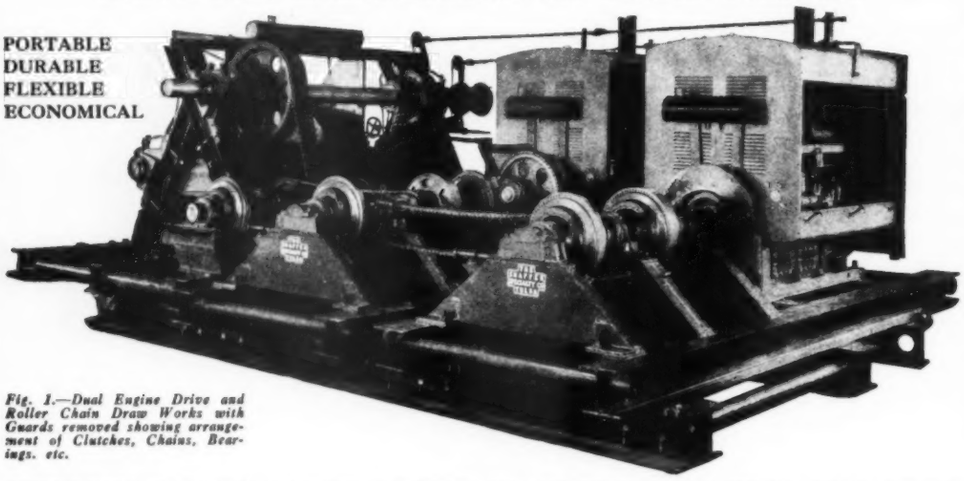


Fig. 1.—Dual Engine Drive and Roller Chain Draw Works with Guards removed showing arrangement of Clutches, Chains, Bearings, etc.

The Shaffer Portable Rotary Drilling Unit is designed for multiple cylinder engine drive. It is simple in design, employing assembled parts of standard make, minimum in number and free from excessive wear. Its construction assures long life and ready accessibility for adjustment and repair. Self-aligning roller bearings, alloy steel shafting, multiple roller chain, machined tooth steel sprockets and friction clutches are used throughout. Chain type flexible couplings connect engine shaft to power shaft. The reverse is the idler sprocket and roller chain type. It is actuated through a friction clutch and is positive in action with immediate accessibility in either direction. The throttle, forward and reverse link are integral, especially designed for the convenience of the operator. The engines with power transmission unit including reverse can be used with any type draw works. Drip oiling system used on all chains.

PROPULSION ROTATIVA PORTATIL SHAFFER DE MOTOR DOBLE O TRIPLE PARA MOTORES DE GAS, DE GASOLINA O PARA MOTORES DIESEL

El grupo Shaffer de perforación rotativa portátil está preparado para admitir propulsión de motor multicilíndrico. Es de construcción sencilla, empleando piezas de montaje de marcas corrientes, en un número mínimo, para evitar en lo posible el desgaste. Su construcción asegura también una gran duración y una gran accesibilidad para los ajustes y las reparaciones. En todo el equipo no se emplean sino cojinetes de rodillos de alineación automática, árboles transmisores de acero especial, una cadena de rodillos múltiples, piñones de fino acero con dientes labrados a máquina y excelentes embragues de fricción. El árbol del motor está conectado al árbol propulsor mediante acoplamientos flexibles de cadena. La marcha atrás es del tipo de engranaje loco y cadena de rodillos. Se pone en movimiento mediante un embrague de fricción y es de una acción positiva, con fácil accesibilidad en ambos sentidos. La válvula estranguladora o de admisión, en conexión con la marcha hacia adelante y la marcha hacia atrás, formando un solo grupo, ha sido especialmente estudiada para le mayor conveniencia del operario. Los motores con grupo de transmisión de fuerza, incluyendo la marcha atrás, pueden emplearse con cualquier tipo de máquina de tracción. Todas las cadenas se aceitan con lubridadores de goteo.

SHAFFER PORTABLE CABLE TOOL RIG FRONT FOR STEAM OR MULTIPLE CYLINDER ENGINE DRIVE

Constructed for steam engine drive shown in Fig. 9, built upon structural steel base frame 6'-6" wide by 21' long. Standard unit includes sampson post, side irons and braces; jack posts, crank carried in 6" boxes; crank shaft sprocket and tug rim. Rig Irons standard A.P.I. pattern. Space on crank shaft for conventional mounting of sand reel and calf wheel sprockets. Steam engine foundation mounted between sampson post and crank shaft, elevated for fly wheel clearance. Engine drives direct to crank shaft with 2" pitch double roller chain. Base extended at rear to mount standard sand reel. Heavily constructed to transmit full power of engine. Can furnish 26' beam with pitman and provision for installing rotary type counter balance if desired. Multiple Cylinder Engine Drive with forward and reverse can be substituted for steam engine if desired.

FRENTE DE APAREJO PORTATIL SHAFFER DE HERRAMIENTA DE CABLE CON PROPULSION DE MOTOR DE VAPOR O MOTOR MULTICILINDRICO

Construído para propulsión por máquina de vapor, según la Fig. 9, montado sobre bastidor de base acero de construcción, de 6 pies 6 pulgadas de anchura y 21 pies de longitud. El grupo normal comprende un montante Sampson, hierros laterales y refuerzos; montantes de balancín, manivela dispuesta en cajas de 6 pulgadas; piñón de cigueñal y llanta de remolque. Piezas de hierro de aparejo, según patrones de la A.P.I. Espacio en el cigüeñal para el montaje corriente de carrete de arena y piñones. Base de la máquina de vapor montada entre el soporte Sampson y el cigüeñal, suspendida para dar espacio al volante. Transmisión del motor directa al cigüeñal, mediante cadena doble de rodillos, con paso de 2 pulgadas. La base se extiende hacia atrás, para la instalación de un carrete normal de arena. Construcción muy firme, para poder transmitir toda la fuerza motriz del motor. Se puede también suministrar con un balancín de 26 pies, provisto de biela de conexión, y con provisión para la instalación de un contrapeso de tipo rotativo. A solicitud se puede también reemplazar la propulsión por máquina de vapor, con una propulsión de motor multicilíndrico, provisto de marcha hacia adelante y marcha atrás.

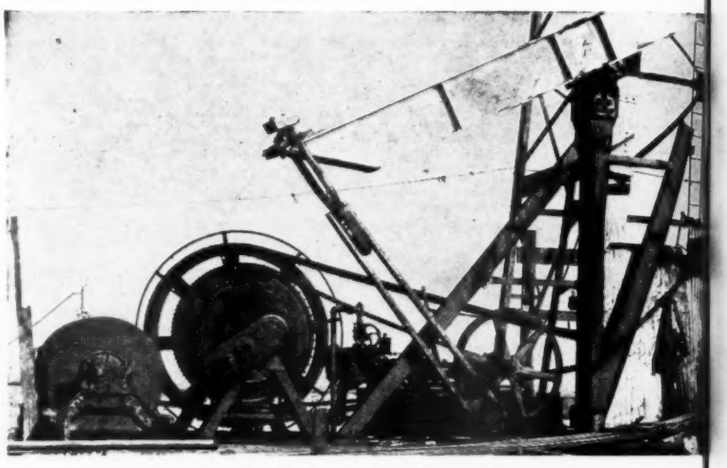
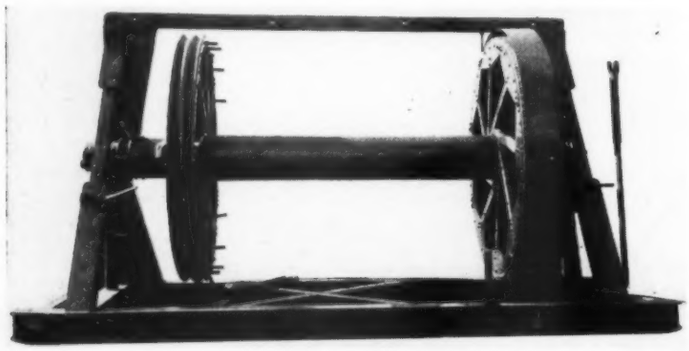


Fig. 9.—Portable Rig Front Arranged for Steam Engine Drive

SHAFFER PORTABLE BULL WHEEL FRAME



Portable Bull Wheel Frame With Wheels Mounted.

Constructed of structural steel shapes, electrically welded together, forming a strong rigid mounting for bull wheels. The Gudgeon Bearings are self-oiling, with self-aligning feature to insure true running shaft. Bearings also provided with end adjustment for variation in length of shafts. The unit can be placed in position for operating, direct from truck. Unitized Bull Wheels, is the final step in complete portability of cable tool drilling equipment.

BASTIDOR PORTATIL SHAFFER DE RUEDA DE TIRO

Construído de formas de acero de construcción, soldadas electricamente, que forman un bastidor sólido y rígido para las ruedas de tiro. Los cojinetes Gudgeon tienen lubricación automática y alineación automática, para que el eje gire siempre en centro perfecto. Los cojinetes están también provistos de regulación lateral, para compensar la variación en longitud de los ejes. El grupo puede colocarse en posición para funcionar directamente en relación con el camión. Las ruedas de tiro unificadas representan la última palabra en portabilidad de material de herramientas de cable de perforación.

SHAFFER ROTARY HOSE COUPLING

For 2", 2½", 3" or 3½" Rotary Hose

1937 Composite Catalog shows entire line of Shaffer Products

El catálogue de combinación de 1937 presenta el completo surtido Shaffer.

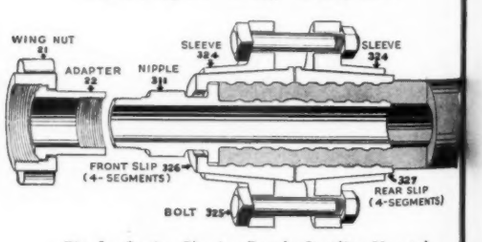


Fig. 7.—Section Showing Female Coupling Mounted.

Withstand high pressure without leakage. Non-Injurious to Hose. Rotary Hose Valu is Measured by the service its Couplings will render. Shaffer Couplings are adopte as Standard equipment by several Major Hose Manufacturers.

ACOPLAMIENTO SHAFFER DE CONEXION FLEXIBL DE ROTATIVA

Resiste las altas presiones sin producir escapes. No causa daño a la conexión flexibl o maguera. El valor práctico de una manguera de rotativa se mide por el servic rendido por sus acoplamientos. Los acoplamientos Shaffer han sido adoptados com equipo normal por numerosos fabricantes de tubería flexible.

Write for Illustrated Literature

THE SHAFFER SPECIALTY CO

BOX 136 WHITTIER STATION TULSA, OKLAHOMA 2440 EAST KING STREET

Export Representative: I. Frank Brown, Rockefeller Center, New York, N. Y., U.S.A.

normally present in the recycle stock of a cracking plant.

The design of two coils in a single pipestill-setting has required a development of the theory of pipestill design. The tendency has been to arrange the heating surface more carefully so all radiant surface is heated uniformly. At the same time multiple burner systems have been used to give uniform flame conditions. Sharp turns in the direction of flow of the hot flue gases have been avoided in the newest designs with the result that flame impingement and local overheating have been corrected. In one new furnace the flames and combustion gases pass upward in a narrow passage on both sides of a centrally located bridge wall which carries radiant tubes. Radiant tubes are also arranged on the side walls and roof, and the convection section is situated above. The gases tend to travel upward in nearly a straight line and thus avoid flame impingement and promote uniform heating conditions. The design is well adapted to controlled heating because in reality it consists of two separate combustion spaces, each having a number of small burners by which fine control can be obtained.

Diesel and gas engines are being used to drive high-pressure charging pumps. Each of these is more efficient than steam-driven pumps and if gas is abundant, gas engine power is much the cheapest. Centrifugal pumps continue in popularity because of the smooth nonpulsating flow of the fluid.

POLYMERIZATION

In the train of technological developments in the manufacture of motor fuels we saw first the economic recovery of straightrun gasoline from crude by simple distillation, then the thermal decomposition of the heavier fractions to produce motor fuels by cracking, to be followed by more intensive thermal decomposition through a process known as reforming. In each step gasoline of higher octane value resulted. As the demand for motor fuels of still higher octane value became pressing it seemed logical that even more intensive thermal decomposition be investigated, combined with a study of the effects from using a catalyst. In the final phases of this transition we are now entering, technologists have been calling upon every branch of physical and organic chemistry to guide them in completely rebuilding the hydrocarbons in the motor fuel fraction, resorting not only to thermal decomposition but to carefully controlled dehydrogenation, hydrogenation, destructive alkylation, alkylation, isomerization, cyclization and polymerization, all of which have come to be grouped under the term "polymerization." Eventually the developments may lead to the production of a single hydrocarbon as a motor fuel in which case the crude or natural gas will simply serve as cheap and convenient sources of hydrogen and carbon.

Polymerization has already reached important proportions in the United States and units in operation and in the course of construction will produce in excess of 500,000 gallons of 82 to 100 octane motor fuel daily.

At present the hydrocarbon gases produced during the cracking of oil serves as the principal charging stock for commercial polymerization units. A high percentage of unsaturates is desirable. Intensive thermal and catalytic research work is going on to permit extending the range of economic charging stocks to include natural gas and, more specifically, to handle the simpler and saturated hydrocarbon gases as low as methane.

Within the past two months great strides have been made in the commercial application of polymerization. A catalytic plant started operating at a Texas City, Tex., refinery about one month ago, which is capable of processing 27,000,000 cubic feet of cracked gases daily and will make 113,000 gallons of gasoline daily. This is the largest unit built

l'écoulement des gaz chauds de combustion, de sorte que, dans les installations les plus récentes, les flammes ne rencontrent plus d'obstacles et il ne se produit plus d'échauffement local. Dans le cas d'un de ces nouveaux foyers, les flammes et les gaz de combustion montent dans un passage étroit de part et d'autre d'un pont de chauffe situé au centre et qui porte les tubes de radiation. On a également prévu des tubes de radiation contre les murs latéraux et la voûte, et l'on a disposé la section de diffusion à la partie supérieure. Les gaz tendent à monter selon une direction sensiblement rectiligne, d'où il résulte que les flammes ne se heurtent plus nulle part et produisent une chauffe uniforme. Cet aménagement se prête très bien au contrôle de la chauffe, car il consiste en réalité de deux régions séparées de combustion, chacune d'elle ayant un certain nombre de petits brûleurs par le moyen desquels un contrôle précis est réalisable.

On a recours à des moteurs Diesel ou à essence pour actionner les pompes d'admission à haute pression. Chacune de ces pompes est plus efficace que celles mues à la vapeur et si l'essence est abondante, le moteur à essence est de beaucoup le plus économique. Les pompes centrifuges continuent à être fort prisées à cause de l'écoulement régulier non-pulsatoire du liquide qui les caractérise.

POLIMERISATION

Dans la suite des développements technologiques de la fabrication des carburants pour moteurs, nous avons vu tout d'abord la récupération économique de l'essence tout venant des pétroles bruts par distillation simple, puis la décomposition thermique des fractions lourdes pour la production des carburants de moteurs par cracking, suivie d'une décomposition thermique plus poussée par l'intervention d'un procédé connu sous le nom de réformation. Après chaque nouveau stade de traitement, on a obtenu des essences d'un indice octane croissant. Comme la demande en carburants moteurs d'un indice octane encore plus élevé devenait de plus en plus pressante, il semblait logique de s'attendre à ce qu'on étudiât les possibilités d'une décomposition thermique encore plus poussée, concurremment à une étude des effets de l'emploi d'un catalyseur. Nous sommes maintenant arrivés aux dernières phases de cette transition, et les technologistes ont fait appel à toutes les ramifications de la chimie organique et de la chimie inorganique aux fins de complètement reconstruire les hydrocarbures de la fraction carburant de moteur. C'est ainsi qu'ils ont eu recours non seulement à la décomposition par la chaleur, mais aussi aux opérations rigoureusement contrôlées de déshydrogénation, hydrogénation, alkylation destructive, alkylation simple, isomérisation, cyclisation et polimérisation, ensemble d'opérations qui ont été groupées sous le terme générique de "polimérisation." Eventuellement, ces travaux pourront aboutir à la production d'un hydrocarbure unique comme carburant moteur, dans quel cas le pétrole brut ou le gaz naturel servirait simplement de source commode et bon marché d'hydrogène et de carbone.

La polimérisation a déjà pris une place importante dans l'industrie des Etats-Unis, et on estime que les installations actuellement en fonctionnement ou en cours de construction produiront ensemble plus de 500.000 gallons de carburant moteur d'indice octane de 82 à 100 comme moyenne journalière.

A l'heure actuelle, les gaz hydrocarbures produits au cours du cracking des huiles constituent le principal stock de chargement des groupes industriels de polimérisation. Une forte proportion de carbures non saturés est désirable. Des travaux intensifs de recherches thermiques et catalytiques sont actuellement en cours aux fins d'étendre la variété des stocks de chargement économi-

lados de una pared central que sirve de soporte a los tubos de radiación. Hay también tubos de radiación dispuestos en las paredes laterales y en el techo, quedando le sección de difusión del calor colocada encima. Los gases tienden a subir casi en línea recta y de este modo evitan el tropiezo de llama y promueven uniformes condiciones de calentamiento. El proyecto o tipo se adapta bien al calentamiento regulado, porque consiste, en realidad, de dos espacios de combustión separados, con cada uno provisto de una serie de quemadores pequeños, que permiten un gobierno exacto.

Se están empleando motores diésel y de gas para accionar bombas cargadoras de alta presión. Estos motores son más eficaces que los de vapor y cuando hay abundante abastecimiento de gas natural, el motor de gas resulta, por supuesto, el más económico de todos. Las bombas centrífugas siguen siendo las más populares, debido a la suave corriente de líquido, sin pulsación, que producen.

POLIMERISACION

En conexión con el desarrollo tecnológico de la manufactura de combustibles de motor, presenciamos primero la recuperación económica de la gasolina pura de los petróleos crudos, por simple destilación, luego la descomposición termal de las fracciones más pesadas, para producir combustibles de motor, por el procedimiento "Cracking," para ser después seguida por una descomposición más intensa, gracias a un nuevo método, llamado procedimiento de reformación. De cada paso ha resultado una gasolina de mayor grado octánico. Cuando creció la demanda de combustibles de mayor valor de octano, se presentó como una cosa muy lógica estudiar una descomposición termal más intesa todavía, en combinación con un análisis de los efectos del empleo de un catalizador. Estamos ahora entrando en las fases finales de esta transición. Los tecnologistas han recurrido a todo conocimiento de química física y orgánica para que les sirva de guía en la completa reconstrucción de los hidrocarburos en la composición de conbustibles de motor, valiéndose no sólo de la descomposición termal, sino también de bien regulados procedimientos de dehidrogenación, hidrogenación, alcalización, isomerisación, ciclisación y polimerisación, todos los cuales han llegado a agruparse bajo la designación general de "polimerisación." Con el tiempo, estos desarrollos conducirán a la producción de un solo hidrocarburo, como combustible de motor, en cuyo caso, el petróleo crudo y el gas natural servirán sencillamente como económicas y convenientes fuentes de hidrógeno y carbono.

La polimerisación ha llegado ya a un notable grado de progreso en los Estados Unidos. Las instalaciones en funcionamiento y las que están en construcción, producirán, dentro de poco, más de 500.000 galones diarios de combustible de motor de 82 a 100 octanos.

Al presente, los gases de hidrocarburo producidos durante el procedimiento "cracking" del petróleo, sirven como el principal material de carga para las plantas de polimerisación comerciales. Un gran porcentaje de productos no saturados resulta conveniente. Se están haciendo profundos estudios sobre la acción termal y los efectos de catalizadores, para poder extender la escála de económicos productos de carga, a fin de incluir el gas natural, y para poder utilizar principalmente los gases de hidrocarburo más sencillos y saturados, incluyendo hasta el metano.

Durante estos últimos dos meses, se ha progresado mucho en la aplicación comercial de la polimerisación. Hace como un mes, se puso en funcionamiento en Texas City, estado de Texas, una planta catalizadora, que tiene capacidad para tratar 27.000.000 de pies cúbicos de gases de procedimiento "cracking" al día, pudiendo producir diariamente como 113.000 galones de gasolina. Esta es la planta de su clase más grande de todas las que se han instalado hasta ahora. En los campos de

to date. In the West Texas gas fields another unique plant is being built to operate in conjunction with a natural gasoline plant, the charge for the unit to be the light products such as ethane, propane, butanes and their unsaturates which are removed from natural gasoline during the stabilization process. This is the first polymerization unit to be built in a natural gasoline plant.

As the polymerization of gases is carried on the production of an unlimited number of chemicals and materials will probably result and simultaneously with the manufacture of abnormally high octane motor fuels will come the perfection of the manufacture of petroleum gums and resins, the commercial production of toluol, rare alcohols, aldehydes, keytones and other bases leading to unlimited fields of research and practical application of their derivatives.

COMBINATION TOPPING AND CRACKING

Increased competition continues to promote the use of combination units. In all respects except flexibility these units are an improvement. They require less capital investment, labor, tank storage, bookkeeping on intermediate plant products, and are less wasteful of heat. However, some difficulties have arisen because widely differing crude oils cannot be processed in the same unit. Some very large units have been built—one having a capacity of 10,000,000 barrels of oil a year. The ever increasing interest in combination units is due largely to there being no longer a ready market for straight gasoline or reason to collect the straight gasoline separately. Some refiners have gone so far as to eliminate most of the storage tanks and to transfer the gasoline through the treating system almost directly to tankcars.

The major technical advantage of combination units are (1) heat is transferred by direct mixing which is perfect heat interchange, (2) heat is not lost by cooling the intermediate products and then reheating them for further processing, (3) intermediate storage tanks are eliminated as well as the bother of measuring and analyzing intermediate stocks and (4) the unit is compact, requiring less labor and supervision. A factor in the successful development of combination units is the perfection of vapor-heat exchangers for recovering heat from the hot vapors of the cracking plant. These exchangers are now reasonably successful although there are still difficulties with leaks, corrosion and coke deposits.

SYNTHETIC MOTOR FUELS AND LUBRICANTS

With 100 octane motor fuel a reality, motor manufacturers in the United States and abroad have started building large numbers of motors to utilize this fuel, more particularly for aviation. The rate at which these motors are being built threatens to exceed greatly the production of suitable fuels but intensive work is under way among major refiners and oil technologists for developing new sources. By selective polymerization one company is converting isobutene into di-isobutene followed by mild hydrogenation which process produces iso-octanes having ratings between 96 and 100 octane number. This process is being modified and by use of catalysts, production of iso-octanes has been greatly increased. Another company is producing substantial quantities of isoproply-ether from propylene to make 100 octane motor fuel blends.

While most of the synthetic motor fuels are being developed for aviation, a distinct upward trend is being noted in the octane value of motor fuels generally and as soon as cost of manufacture of 90 to 100 octane gasoline is reduced suffi-

ques, notamment afin de pouvoir admettre le gaz naturel et, plus exactement, afin de pouvoir envisager l'emploi d'hydrocarbures gazeux saturés plus simples des séries inférieures à partir du méthane.

Dans le courant des deux derniers mois, on a fait des progrès très marqués dans l'application industrielle de la polimérisation. Un atelier catalytique a commencé à fonctionner à Texas City, Texas, dans une raffinerie, il y a un mois environ: cette installation est à même de traiter 27.000.000 pieds cubes de gaz crackés par jour et de produire 113.000 gallons d'essence par jour. C'est la plus grande installation réalisée à ce jour. Dans les champs de gaz naturel de West Texas, une autre installation remarquable est en cours de construction et appelée à fonctionner en rapport avec une fabrique d'essence naturelle; le charge prévue pour cette installation comprendra des produits légers comme l'éthane, le propane, les butanes et leurs dérivés non saturés qui sont extraits de l'essence naturelle au cours du procédé de stabilisation. C'est la toute première installation de polimérisation en construction dans une fabrique d'essence naturelle.

A mesure que la polimérisation des gaz se répand, il en résultera très probablement la production d'un nombre illimité de produits chimiques et autres substances, et parallèlement avec la fabrication de carburants moteurs à indice octane exceptionnellement élevé, on verra se perfectionner la fabrication des gommes et résines de pétrole, la production commerciale du toluol, des alcools rares, des aldéhydes, des cétones et d'autres bases, ce qui ouvrira des horizons nouveaux illimités dans le domaine des recherches et vaudra des applications pratiques aux dérivés de ces produits.

DISTILLATION COMBINEE

La concurrence croissante continue à encourager l'emploi de groupes de distillation combinée. A tous égards, sauf la souplesse d'opération, ces groupes combinés marquent un progrès. Ils immobilisent moins de capitaux, demandent moins de main-d'oeuvre, de réservoirs d'emmagasinage, et de comptabilité pour des produits intermédiaires, et se traduisent par une réduction marquée du gaspillage de la chaleur. Toutefois, des difficultés se sont parfois présentées par suite du fait qu'on ne peut pas traiter dans le même groupe des pétroles bruts de composition trop divergente. Il a été construit, notamment, des groupes-combinaison très importants—entre autres un ayant une capacité de 10.000.000 de barils de pétrole par an. Si l'intérêt en ces groupes-combinaison va sans cesse grandissant, c'est qu'il n'y a plus de débouchés faciles pour le placement de l'essence pure, ni de raison de recueillir l'essence pure séparément. Certains raffineurs ont même été jusqu'à supprimer la plupart des réservoirs d'emmagasinage et à amener l'essence qui sort du cycle de traitements quasi-directement aux wagons-citernes.

Les principaux avantages techniques des groupes-combinaisons sont les suivants: (1) la chaleur se transmet par mélange direct, ce qui assure un échange de chaleur parfait, (2) la chaleur ne se perd pas par suite du refroidissement des produits intermédiaires et de leur réchauffage avant les traitements suivants, (3) les réservoirs d'emmagasinage intermédiaires se trouvent supprimés, ainsi que l'ennui de devoir mesurer et analyser les stocks intermédiaires, et (4) le groupe se distingue par la compacité, demandant par suite moins de surveillance et moins de main-d'oeuvre. Un facteur qui a beaucoup contribué à assurer le succès à ces groupes-combinaison réside dans le perfectionnement d'échangeurs de chaleur de vapeurs qui récupèrent la chaleur des vapeurs chaudes provenant de l'installation du "cracking." On peut dire que ces échangeurs de chaleur donnent dès maintenant des résultats dignes d'intérêt, bien qu'on se heurte encore à des ennuis provenant de fuites, de corrosion et d'accumulation de coke.

gas natural del oeste de Texas, se está construyendo otra planta, que funcionará en combinación con una refinería de gasolina natural. La carga para esta nueva planta estará representada por productos livianos, tales como etano, propano, butanos y sus derivados sin saturar, los cuales se quitan de la gasolina natural durante el procedimiento de estabilización. Esta es la primera instalación o planta de polimerisación en combinación con una planta de gasolina natural.

Con el desarrollo de la polimerisación de los gases, va a resultar una multitud de substancias químicas y materiales, y simultáneamente con la manufactura de combustibles de motor de un extraordinario valor octánico, vendrá el perfeccionamiento de la manufactura de gomas y resinas de petróleo, la producción comercial de toluol, raros alcoholes, aldehidos, y otras bases conducentes a ilimitados campos de investigación y práctica aplicación de todos sus derivativos.

DESTILACION COMBINADA

La creciente competencia continúa promoviendo el empleo de unidades de combinación. Con excepción de la flexibilidad, estas unidades constituyen un progreso en todo sentido. Requieren menor inversión de capital, menos labor, almacenaje, contabilidad de los productos intermediarios y por otra parte, derrochan menos calor. Se han presentado, sin embargo, algunas dificultades, a causa de que los petróleos crudos vastamente diferentes en constituyentes, no pueden destilarse en un mismo equipo. Entre las grandes unidades construídas hay una que tiene capacidad para 10.000 barriles de petróleo al año. El creciente interes en estas unidades de combinación se debe principalmente al hecho de que no hay más mercado para la gasolina pura o razón alguna para destilarla separadamente. Algunos refinadores han llegado hasta el punto de eliminar casi todos los tanques o depósitos de almacenaje, transfiriendo la gasolina casi directamente del sistema de tratamiento a los vagones tanques.

La principal ventaja técnica de las unidades de combinación son (1) el calor es transferido por mezcla directa, lo que produce un perfecto intercambio de calor, (2) el calor no se pierde en el enfriamiento de los productos intermediarios y en su recalentamiento para su adicional tratamiento, (3) se eliminan los tanques o depósitos intermediarios, lo mismo que la molestia de madir y analizar los productos intermediarios, y (4) la unidad es compacta, exigiendo menos trabajo y vigilancia. Un factor en el satisfactorio desarrollo de las unidades de combinación ha sido el perfeccionamiento de los cambiadores de vapor y calor, para recuperar el calor de los vapores calientes de la plata de destilación por el procedimiento cracking. Estos cambiadores están dando buenos resultados, a pesar de que presentan todavía dificultades a causa de escapes, corrosión y acumulación de coque.

COMBUSTIBLES Y LUBRICANTES SINTETICOS DE MOTOR

Siendo ya una realidad el combustible de 100 octanos, los fabricantes de motores en los Estados Unidos y el extranjero han empezado a construir un gran número de motores, particularmente en modelos de aviación, para funcionar con este tipo de combustible. La rapidez con que se ha emprendido la construcción de estos motores amenza exceder mucho la producción de adecuados combustibles, pero los principales refinadores, con la ayuda de tecnologistas de petróleo, han emprendido un intenso trabajo en desarrollar nuevas fuentes de abastecimiento. Una compañía, mediante polimerisación selectiva, está convirtiendo el isobuteno en bisobuteno suplementado por leve hidrogenación,

PUMPS FOR THE WORLD OF OIL

The widespread use of Wheatley Pumps by major oil companies over a period of many years is indicative of the mechanical perfection of these units and their adaptability in oil field service the world over. Illustrated below are some of the more popular units. For complete information send for catalog.

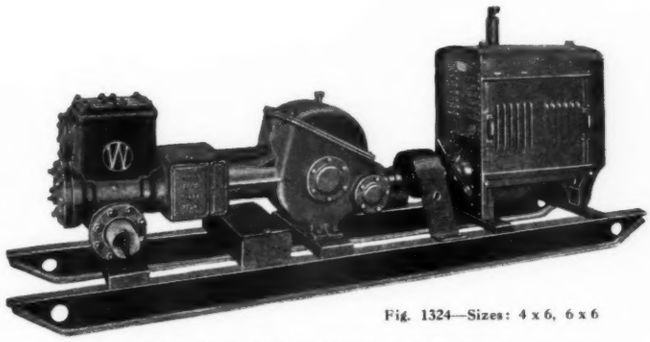


Fig. 1324—Sizes: 4 x 6, 6 x 6

WHEATLEY "CHALLENGER"

These pumps are adaptable to a wide range of oil field service. They are furnished with skids or mounted on pneumatic tires. A complete weatherproof housing makes shed unnecessary. Strainer is standard equipment. Shut down unnecessary. Equipped for reducible liners.

Ces pompes peuvent s'adapter à une grande variété de service pétrolier au chantier. Elles sont munies de patins ou montées sur pneus. Une gaine complètement fermée, à l'épreuve des intempéries, permet de se passer de hangar. L'équipement standard prévoit une crépine. Plus de temps d'arrêt en service. Equipées pour fourreaux réductibles.

Estas bombas se pueden adaptar a una gran variedad de servicio en los campos petrolíferos. Se suministran montadas en patines o montadas en llantas neumáticas. Una caja completamente cerrada, a prueba de la intemperie, hace innecesario el empleo de un techo. En su dotación corriente se incluye un colador. Su seguridad reduce a un mínimo la paralización del trabajo. Acondicionadas a canalización reductible.

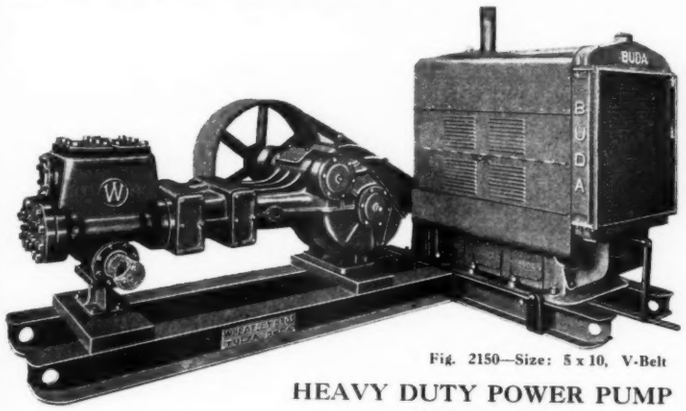


Fig. 2150—Size: 5 x 10, V-Belt

HEAVY DUTY POWER PUMP

(High Pressure)

This pump has won widespread recognition because of its great capacity, few operating parts and low cost. The pumping unit is entirely enclosed and is particularly suited for handling large capacities at high pressure, having a fluid end with interchangeable liners from 2 1/2-inch to 5-inch.

POMPES POUR LE MONDE DU PETROLE

L'emploi très répandu des pompes Wheatley par les plus importantes compagnies de pétrole depuis bien des années est une preuve irréfutable de la perfection mécanique de ces groupes et de leur adaptabilité dans les divers champs de pétrole en exploitation dans le monde. Quelques-uns des groupes les plus prisés sont représentés ci-dessous. Pour détails complets, demandez-nous notre catalogue.

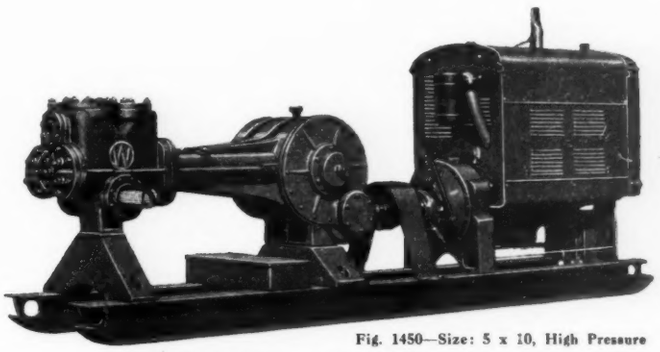


Fig. 1450—Size: 5 x 10, High Pressure

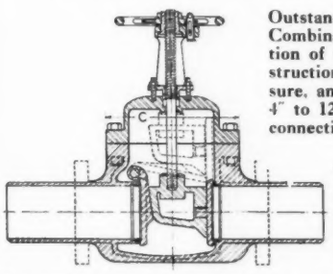
WHEATLEY "CHAMPION" UNIT

This unit is largely responsible for the reputation we have won as a leader in the manufacture of pumping units. It embodies improved features in design to meet the increasing demands for a self-contained, fully enclosed, self-lubricating, semi - portable pumping outfit. It combines minimum weight with greater pumping capacity. Equipped for reducible liners. Direct drive, also electric motor driven.

C'est à ce groupe que nous devons dans une grande mesure la renommée que nous nous sommes acquise dans la construction de groupes de pompage. Il offre des perfectionnements dans le tracé qui répondent aux exigences croissantes demandant un groupe de pompage autonome, complétement enfermé, auto-lubréfiant et semi-portatif. Il combine un poids minimum avec un plus grand débit de pompage. Equipé pour fourreaux réductibles.

Es precisamente a este grupo que debemos, en gran parte, la fama que hemos adquirido en la construcción de bombas. Ofrece refinamientos en proyecto que responden cumplidamente a las crecientes exigencias en materia de un equipo de bomba independiente, completamente encerrado, de lubricación automática y de tipo semiportátil. Combina un peso mínimo con una máxima capacidad de rendimiento. Este grupo está acondicionado a canalización reductible y puede accionarse con motor propio o con fuerza transmitida por motor eléctrico.

WHEATLEY COMBINATION CHECK AND GATE VALVES



Outstanding among Wheatley products is this Combination Check and Gate Valve (aross section of which is illustrated). It is of rugged construction, and is made of cast iron for low pressure, and in steel for high pressure, in sizes from 4" to 12". Designed for either screwed or flanged connections, or for welding into the line.

Ce robinet combinaison vanne et arrêt se distingue parmi les produits Wheatley (coupe ci-contre). De construction robuste, il est prévu en fonte pour basses pressions et en acier pour hautes pressions, pour les tailles de 4 à 12 pouces. Prévu soit pour raccords vissés ou brides, ou pour soudage sur la conduite.

Esta combinación de válvula de retención y de compuerta se incluye entre los más sobresalientes productos Wheatley. (Mostramos aquí un diagrama seccional). Es de muy firme construcción y se hace de hierro fundido, para las presiones bajas, y de acero para las presiones altas, en tamaños de 4 a 12 pulgadas. Se suministra con conexión roscada o conexión con pestaña, o bien, preparada para su soldadura al conducto.

Cette pompe s'est acquise une renommée générale à cause de son grand débit, du petit nombre de pièces mobiles et de son bon marché. Le groupe de pompage est entièrement enfermé et convient surtout à la manutention de fortes capacités sous de fortes pressions, étant muni d'un bout pour fluide avec fourreaux interchangeables de 2½ à 5 pouces.

Esta bomba se ha hecho de una fama general a causa de su gran capacidad, reducido número de piezas de movimiento y precio muy moderado. Todo el grupo de bombaje, está completamente encerrado. Se adapta especialmente al manejo de grandes capacidades a elevadas presiones. Está provista de extremo de líquido con forro intercambiable de 2½ a 5 pulgados.

WHEATLEY PUMPS AND VALVES

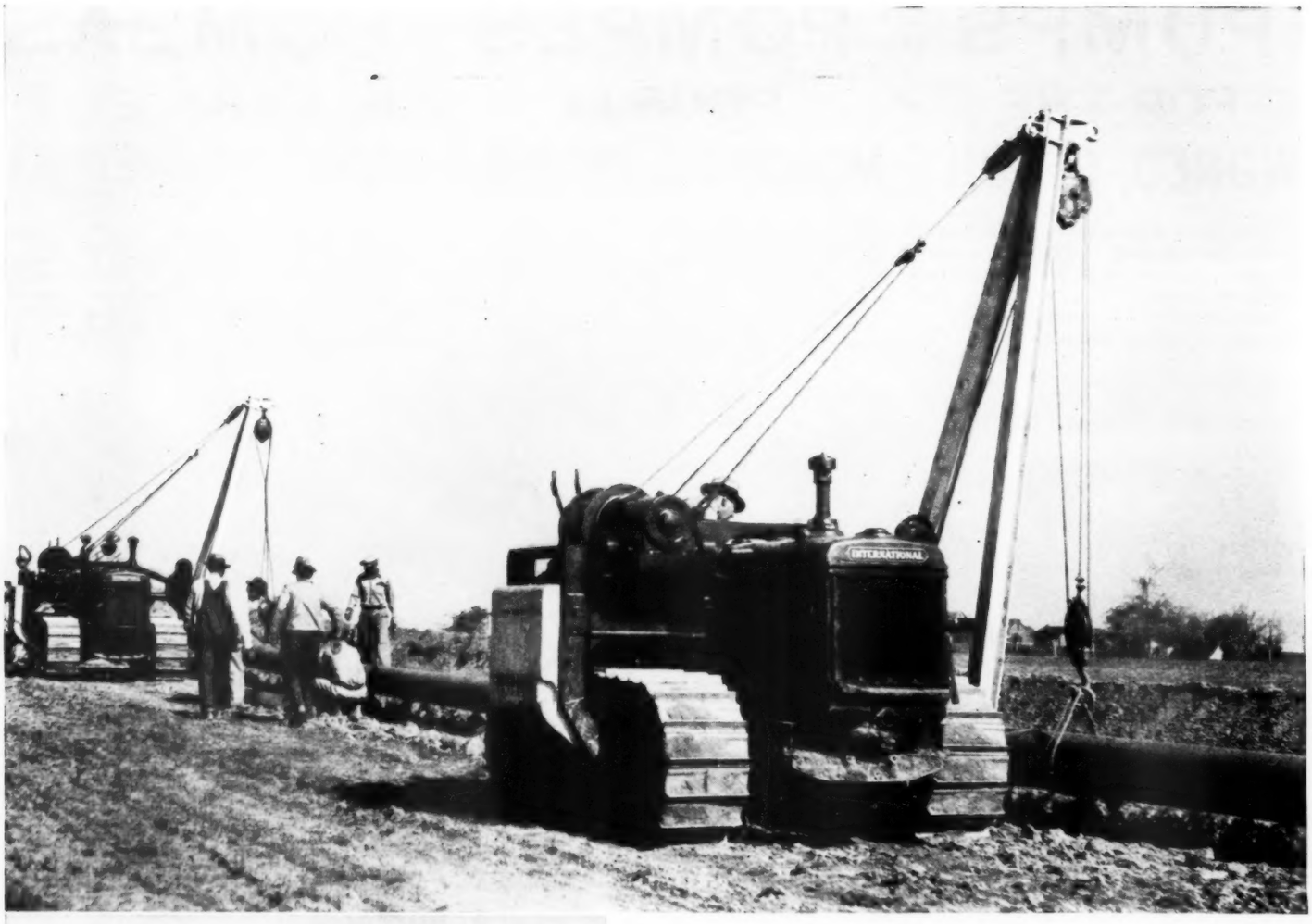
WHEATLEY BROS. PUMP AND VALVE MANUFACTURERS

TULSA, OKLAHOMA

TOM WHEATLEY COMPANY
1111 Austin Avenue
Houston, Texas

Representatives:
I. FRANK BROWN
30 Rockefeller Plaza
New York City

J. D. RUSH COMPANY
5199 District Blvd.
Los Angeles, Calif.



DEPENDABLE POWER FOR PIPE HANDLING

TRACKSON Pipe Layers are designed and built to lay pipe on any kind of right-of-way. They furnish dependable power for lifting, lowering, carrying and bending pipe and will stand up under the toughest kind of cross country service. The machines are husky in construction, easy to operate, fast and efficient. Winches are worm driven for safety and are mounted on side opposite to boom—utilizing their weight to increase lifting capacities. Full accessibility of the International tractors is also retained in this construction. Operators have full and unobstructed vision—can handle the machine in close quarters and keep within narrow right-of-ways. Every possible operating feature and refinement is incorporated in these modern Pipe Layers and we will welcome the opportunity of telling you more about them. For full information please wire, phone or write TRACKSON COMPANY, Milwaukee, Wisconsin, U. S. A.

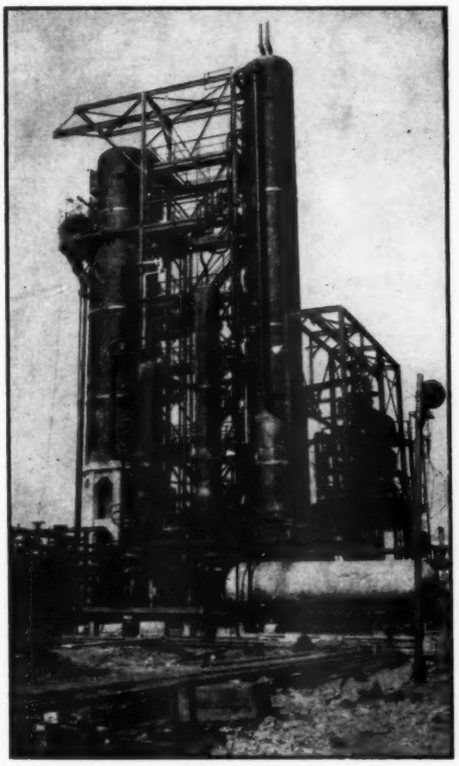
TRACKSON PIPE LAYER

ciently it seems reasonably that many automobile engines will be built to utilize it.

The preparation of lubricants by cracking and by polymerization has been given comparatively little general recognition but substantial quantities of medium viscosity lubricating oils of superior quality have been made by cracking heavy viscous lubricating oil stocks. Utilization of several hydrogenation units for processing raw lubricating stocks to raise the viscosity index has been practiced for several years. The feasibility of synthesizing lubricants by polymerization of gases has been only touched upon.

LIGHT OIL TREATING

The purifying operation as applied to petroleum distillates, especially gasoline and kerosene, has for its object the removal of corrosive substances, reduction of tar and gum, and to make a product of good color, water-white, and free from objectionable odor. Further, the finished product must be reasonably stable; that is, it should withstand oxidation and not liable to decompose. This means the product should not, while in storage, develop a bad odor, go off color and increase in gum content. Any chemical, or combination of chemicals, used in a refining process of a petroleum



Two-stage distillation unit

product, shall cause neither the introduction of objectionable substances nor act in any way to reduce the quality of the product.

Straightrun gasoline usually needs but little treatment to bring it within the recognized specification for the commercial product. Sometimes all that is required is to treat the product with small quantities of caustic soda, and seldom is it necessary to do more than apply the doctor treatment.

Pressure distillate usually requires treatment with sulfuric acid to remove tarry matters, sulfur compounds and substances that have an objectionable odor. After treatment with the acid the product is distilled, the overhead being blended with the straightrun gasoline to make a finished motor fuel. Very often the gasoline from the pressure distillate is blended with straightrun and the blend sweetened.

Kerosene made from low sulfur crudes will

CARBURANTS ET LUBREFIANTS SYNTHETIQUES DE MOTEURS

Maintenant que le carburant moteur à indice octane de 100 est devenu une réalite, les fabricants de moteurs des Etats-Unis et de l'étranger se sont mis à construire des quantités importantes de moteurs appeles à utiliser ce carburant, tout particulièrement en aviation. En fait, la cadence avec laquelle ces moteurs se construisent actuellement menace de déterminer une surproduction de ces moteurs par rapport aux quantités disponibles de carburants appropriés, mais il faut dire que les principaux raffineurs et technologistes du pétrole se sont engagés de leur côté, dans des recherches intensives visant à tirer parti de nouvelles sources. Par le polimérisation sélective, une compagnie convertit l'isobutène en di-isobutène, puis le soumet à une légère hydrogénation, obtenant ainsi des iso-octanes dont l'indice en octane est compris entre 96 et 100. Ce procédé est en cours de modification, et par l'emploi de catalyseurs, la production des iso-octanes a été très fortement accrue. Une autre compagnie prépare des quantités importantes d'éther isopropyle à partir de propylène afin d'obtenir des mélanges carburants pour moteurs d'un indice en octane de 100.

Bien que la plupart des carburants synthétiques pour moteurs soient mis au point pour l'aviation, on remarque aussi une amélioration nette de l'indice octane des carburants moteurs en général, et des que le prix de revient de fabrication de l'essence à indice octane de 90 à 100 aura été suffisamment abaissé, on peut raisonnablement s'attendre à ce que de nombreux fabricants construisent des moteurs d'automobile pour en tirer parti.

La préparation des lubréfiants par le procédé du cracking et par polimérisation ne s'est pas pratiquée sur une grande échelle, mais on a cependant préparé des quantités importantes d'huiles de graissage de viscosité moyenne de qualité supérieure en soumettant au cracking des stocks d'huiles lubréfiantes visqueuses et de forte densité. En outre, l'utilisation de plusieurs unités d'hydrogénation dans le traitement des huiles brutes de graissage, aux fins d'en augmenter l'indice de viscosité, est une pratique courante depuis plusieurs années. On peut dire en manière de conclusion qu'on n'a fait qu'entrevoir tout l'intérêt qu'il y a à préparer les huiles de graissage synthétiques par la polimérisation des gaz.

TRAITEMENT DES HUILES LEGERES

L'opération de purification qu'on applique aux produits de distillation du pétrole, en particulier à la gazoline ou essence et à la kérosine ou pétrole lampant, a pour objet d'en extraire les substances corrosives, de réduire les goudrons et les gommes en suspension, et d'obtenir en fin d'opération un produit de bonne couleur, d'une transparence aqueuse, et exempt de toute odeur objectionnable. En outre, le produit fini doit être raisonnablement stable, c'est à dire qu'il lui faut résister à l'oxydation et ne pas être sujet à se décomposer. En d'autres termes, le produit fini ne doit pas, une fois en magasinage, dégager une mauvaise odeur, changer de couleur et augmenter sa teneur en matières gommeuses. Par suite, tout produit chimique, ou combinaison de produits chimiques, entrant en jeu dans le procédé de raffinage d'un produit pétrolier, ne devra ni y introduire des substances objectionnables, ni causer à quelque degré que ce soit une réduction de la qualité du produit en question.

L'essence tout venant ne demande généralement que peu de traitement pour lui assurer les caractéristiques reconnues pour l'essence du commerce. Dans certains cas, tout ce qu'il y a lieu de faire est de traiter le produit par de petites quantités

procedimiento que produce isoctanos, cuyos valores quedan comprendidos entre 96 y 100 octanos. Este procedimiento se está modificando, gracias al empleo de catalizadores, para aumentar grandemente la producción de isoctanos. Otra compañía está produciendo considerables cantidades de éter isopropilo de propileno, para hacer mezclas de combustible de 100 octanos especiales para motores.

A pesar de que casi todos los combustibles sintéticos de motor se están desarrollando para uso en la aviación, se observa, sin embargo, una creciente tendencia hacia aumentar el valor octánico de los combustibles de motor de uso general, y tan pronto como el costo de manufactura de la gasolina de 90 a 100 octanos se reduzca convenientemente, es dable anticipar que se construirán muchos motores de automóvil que puedan utilizarla.

La preparación de lubricantes por el procedimiento de cracking y por polimerisación ha recibido comparativamente poca atención general. Sin embargo, se ha producido ya una buena cantidad de aceites lubricantes de mediana viscosidad, de superior calidad, sometiendo pesados aceites lubricantes de gran viscosidad, al procedimiento de cracking. La utilización de varias unidades de hidrogenación para el tratamiento de aceites lubricantes crudos, a fin de aumentarles el índice de viscosidad, ha estado en práctica desde hace varios años. Se puede decir que sólo ahora se está empezando a comprender la posibilidad de producir aceites sintéticos mediante la polimerisación de los gases.

TRATAMIENTO DEL PETROLEO LIVIANO

La purificación, tal como se aplica a los destilados de petróleo, particularmente a la gasolina y la kerosina, tiene por objeto quitar las substancias corrosivas, reducir el alquitrán y la gomosidad y hacer que el producto resulte de un buen color, blanco de agua, y exento de olor desagradable. Por otra parte, el producto refinado debe ser racionalmente estable, es decir, debe resistir la oxidación y no quedar expuesto a descomponerse. En otros términos, el producto, mientras está almacenado, no debe desarrollar un mal olor, cambiar de color y acumular substancias gomosas. Cualquiera substancia química o combinación de éstas, empleada en la refinación de un producto de petróleo, no debe, por lo tanto, causar la introducción de materias extrañas inconvenientes, o actuar en algún sentido que reduzca la calidad del producto.

La gasolina de primera destilación necesita ordinariamente muy poco tratamiento para quedar dentro de las características indicadas para el producto comercial. A veces, todo lo que se requiere es tratar el producto con pequeñas cantidades de soda cáustica, y rara vez se presenta le necesidad de someterlo a otros procedimientos.

Los destilados bajo presión requieren generalmente tratamiento con ácido sulfúrico, para depurarlos de substancias de alquitrán, compuestos de azufre y otras materias de olor desagradable. Después del tratamiento con ácido, el producto se destila y la parte destilada se mezcla con gasolina de primera destilación, para formar un adecuado combustible de motor. A menudo, la gasolina del destilado bajo presión se mezcla con gasolina de primera destilación y la mezcla se somete desqués a purificación.

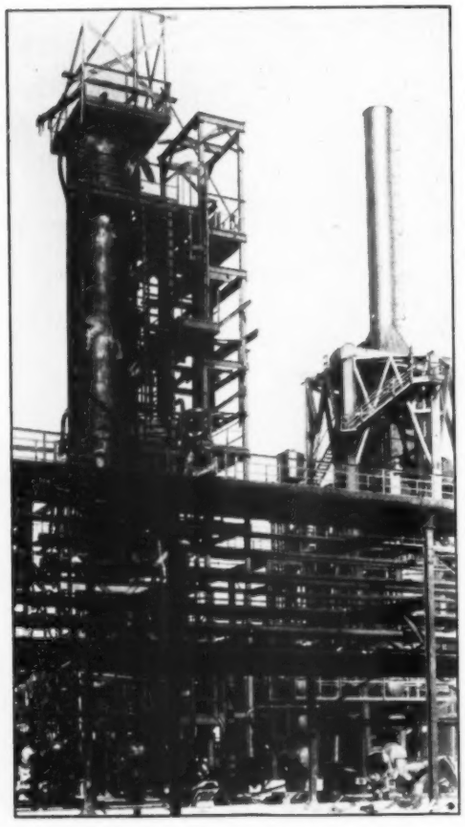
La kerosina destilada de petróleos crudos con bajo contenido de azufre, rara vez necesita más tratamiento que el de purificación. Cuando la kerosina destilada es pesada y de un color oscuro, se trata generalmente con ácido sulfúrico y se purifica después.

Los métodos hasta aquí indicados son los más corrientes. Se emplean también otros métodos. En uno se emplea cloro, o algún compuesto de cloro, para el tratamiento de la gasolina de gran densidad. En otro se aprovecha el bióxido de azufre, en forma líquida, en lugar de ácido. Hay

seldom need any other treatment than sweetening. When the kerosene distillate is heavy and dark colored it is usually treated with sulfuric acid followed by doctor sweetening.

The operations mentioned here are those most extensively used. Other processes are in use. In one chlorine, or a compound of chlorine, is used for treating high-gravity gasoline. Another makes use of liquefied sulfur dioxide in place of acid. A process in which zinc chloride is the treating chemical has been applied and recently copper in various forms has been successfully introduced. In some plants gasoline vapors are treated in the vapor phase by passing the hot vapors through fuller's earth or certain especially prepared clays, or the clay material may be mixed with the oil and passed through the furnace at a high velocity.

Sulfuric acid has been extensively used for treating of light oils; a recent improvement is the modification proposed by Halloran. He applies the



Stabilizing tower for combination unit

acid at low temperature, 0 to 10° F., for reducing treating losses and retention of antiknock substances. Sulfuric acid has been replaced by liquid sulfur dioxide, in the low temperature process of Edeleanu.

The Gray Process is a method for treating in the vapor phase by causing the hot vapors to pass through a filtering clay and the condensed heavy materials to be removed. The patent of Prutzman and also Osterstrom relate to a method wherein the adsorbent is mixed with the oil and then passed through the hot furnace tubes.

The Day Process, of the Universal Oil Products Co., comprises treating with liquid hydrochloric acid in the presence of a metal, such as brass. A similar process is that of Morrell, where the treatment takes place with hydrochloric acid at elevated temperature.

The Lachman Process relates to a purifying method for petroleum oils consisting in passing the hot vapors through, or in contact with, an aqueous solution of zinc chloride.

The Kennedy method includes heating the distillate in the presence of solutions of salt, copper sulfate and sodium hydroxide. Cross utilizes clays

de soude caustique, et il est rarement nécessaire d'appliquer davantage que le traitement dit du "docteur."

Le distillatum de pression demande en général à être traité par l'acide sulfurique afin d'en éliminer les matières goudronneuses, les composés sulfureux et les substances qui dégagent une odeur objectionnable. Après le traitement à l'acide, on soumet le produit à une distillation, puis on mélange les produits de tête avec de l'essence ou gazoline tout venant pour obtenir un carburant moteur fini. Très souvent, on mélange l'essence, préparée avec le distillatum de pression, avec du tout venant, puis on épure le mélange ainsi obtenu.

La kérosine ou pétrole lampant, préparée à partir de pétroles bruts à faible teneur de soufre, ne demande généralement pas d'autre traitement que l'épuration ou assainissement. Mais lorsque la kérosine distillée est épaisse et de couleur foncée, on la traite le plus souvent par l'acide sulfurique, et l'on fait suivre d'une épuration selon le traitement dit du "docteur."

Les opération que nous mentionnons ici sont celles les plus couramment employées. Il existe d'autres procédés en usage. Selon l'un d'eux, on emploie le chlore, ou un composé du chlore, pour traiter l'essence légère. Un autre procédé a recours au gaz sulfureux liquéfié au lieu d'acide. Citons encore une méthode dans laquelle le chlorure de zinc est l'agent chimique de traitement, et, tout récemment, on a introduit avec succès l'emploi du cuivre sous diverses formes. Dans certaines raffineries, on traite les vapeurs d'essence dans la phase vapeur en faisant tarverser les vapeurs chaudes dans de la terre de foulon ou dans des argiles préparées spécialement pour cette application; on peut encore mélanger la substance argileuse avec les huiles, et la faire passer à travers le foyer à une grande vitesse.

On a fait un usage considérable de l'acide sulfurique dans le traitement des huiles légères; citons parmi les perfectionnements récents la modification proposée par Halloran. Selon cette méthode, on applique l'acide à de basses températures, 0 à 10° F., aux fins de réduire les pertes en cours de traitement et de retenir les substances anti-détonantes. Enfin, dans le procédé à basse température de Edeleanu, l'acide sulfurique a été remplacé par le gaz sulfureux liquide.

Le procédé Gray est une méthode qui consiste à traiter les produits de distillation dans la phase vapeur en faisant passer les vapeurs chaudes à travers une argile filtrante et en extrayant les matières lourdes condensées. Le brevet de Prutzman et celui d'Osterstrom ont pour objet une méthode selon laquelle l'agent adsorbant est mélangé aux huiles, puis amené à passer à travers les tubes chauds du foyer.

Le procédé Day, de l'Universal Oil Products Co., comprend le traitement par l'acide chlorhydrique liquide en présence d'un métal, notamment le laiton. Un procédé similaire est celui de Morrell, qui préconise le traitement par l'acide chlorhydrique à température élevée.

Le procédé Lachman se rapporte à une méthode de purification pour les huiles pétrolières qui consiste à faire passer les vapeurs chaudes à travers, ou en contact avec, une solution aqueuse de chlorure de zinc.

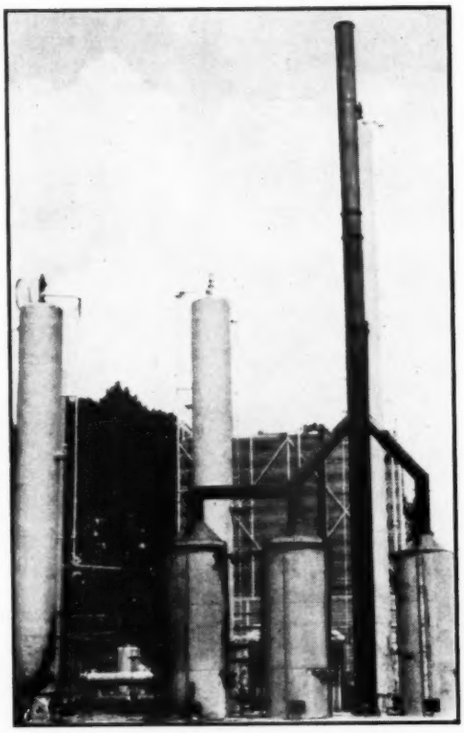
Selon la méthode Kennedy, on fait chauffer le distillatum en présence de solutions de sel, sulfate de cuivre et soude. Cross a recours à des argiles qui contiennent des sels de cuivre adsorbes, en contact avec lesquels on amène les vapeurs qu'on désire désulfurer et désodoriser. Il existe un grand nombre d'autres méthodes dans lesquelles le cuivre est le métal essentiel dans le traitement. Day révèle l'emploi d'un mélange de sulfate de cuivre et de chlorure d'ammonium épurer ou assainir l'essence ou gazoline, qu'on mélangera de préférence avec un adsorbant terreux. L'avantage principal de l'emploi du cuivre réside dans le fait qu'il s'oppose à l'introduction d'un excès de soufre.

Le procédé de l'hydrogénation est appliqué

también otro procedimiento, que se vale del clorure de cinc, como agente químico, y recientemente, se ha introducido con éxito el empleo de cobre, en varias formas. En algunas destilerías de gasolina, los vapores se tratan en su fase de vapor, pasándolos, en su estado caliente, por galactita o por ciertas arcillas de especial preparación, o bien, el material arcilloso se mezcla con el petróleo y se pasa por el horno a alta velocidad.

El ácido sulfúrico se ha usado mucho para el tratamiento de los petróleos livianos. Un reciente progreso es la modificación propuesta por Halloran. Este aplica el ácido a bajas temperaturas de 0 a 10° F., para reducir las pérdidas de tratamiento y retener las substancias antidetonantes. El ácido sulfúrico ha sido reemplazado por el bióxido de azufre, en el procedimiento de baja temperatura de Edeleanu.

El procedimiento Gray es un tratamiento en la fase de vapor, que hace que los vapores calientes pasen por una arcilla filtradora, separándose, por condensación, los materiales pesados. La patente



Reboilers and fractionating equipment

de Prutzman y también la de Osterstrom se refieren a un método en el cual el agente absorbente se mezcla con el petróleo y todo se pasa por los tubos calientes del horno.

El procedimiento Day, de la Universal Oil Products Co., consiste en tratar el petróleo con ácido hidroclórico líquido, en presencia de algún metal, como el latón. Un procedimiento similar es el de Morrell, en el cual el tratamiento se efectúa con ácido hidroclórico a alta temperatura.

El procedimiento Lachman se refiere a un método de purificación para los aceites de petróleo y consiste en pasar los vapores calientes a través, o en contacto, con una solución acuosa de cloruro de cinc.

El método Kennedy comprende el calentamiento del destilado en presencia de soluciones de sal, sulfato de cobre e hidróxido de sodio. El procedimiento Gross utiliza arcillas, que contienen sales de cobre absorbidas, por las cuales se pasan los vapores para su desulfuración y desinfección. El método Day comprende el empleo de una mezcla de sulfato de cobre y cloruro de amoniaco, para purificar la gasolina, preferiblemente en combinación con alguna tierra absorbente. Las ventajas del uso del cobre están en que este metal evita la introducción de un exceso de azufre.

El procedimiento de hidrogenación obedece al

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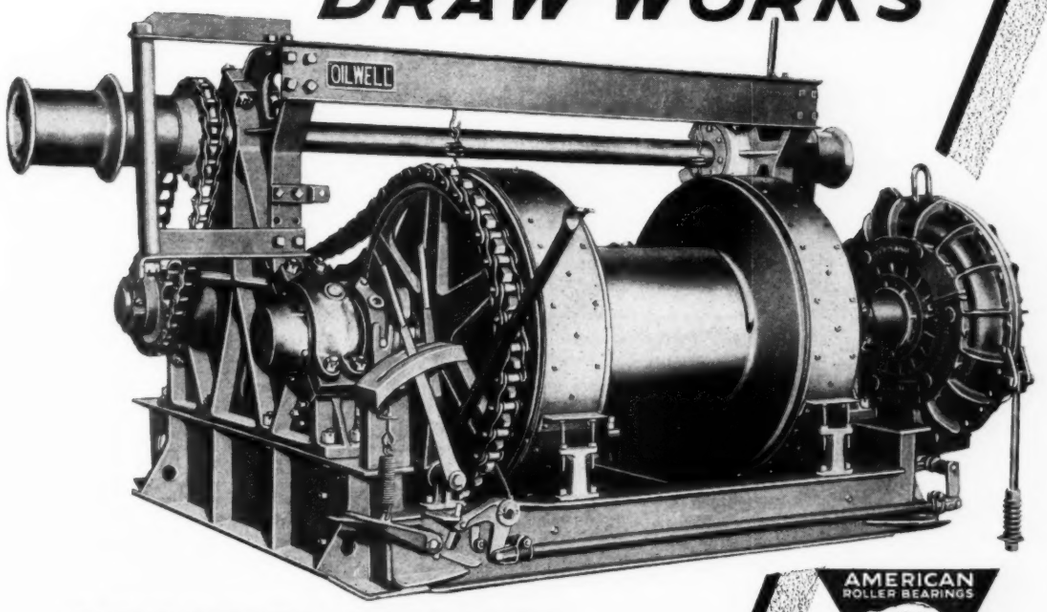

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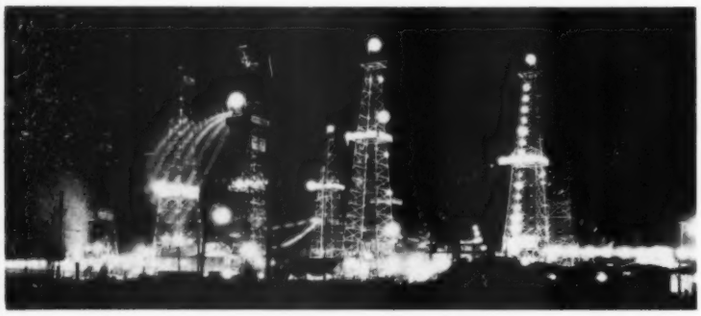
1938 INTERNATIONAL PETROLEUM EXPOSITION

TULSA, OKLA., U.S.A., MAY 14-21, 1938



In announcing the 1938 International Petroleum Exposition, the officers and management of the "World's Fair of the Oil Industry" assures the greatest exposition of new methods, machinery and equipment in the history of *the world's first, greatest, oldest and only International oil show.* The 1938 Exposition, marking the fifteenth anniversary of the founding of the greatest exposition devoted to any single industry in the world, will present an almost unbelievable advancement in efficiency, economy, speed and safety in the geophysical, producing, refining, transportation and marketing branches of the great petroleum industry. The board of directors respectfully invites your attendance and participation.

INTERNATIONAL PETROLEUM EXPOSITION
Signed: W. G. SKELLY, President.

l'Exposition Internationale du Pétrole de 1938

En faisant l'annonce de l'Exposition Internationale du Pétrole de 1938, les organisateurs et la direction de la "Foire Mondiale de l'Industrie Pétrolière" promettent l'exposition la plus grandiose des nouvelles méthodes, machines et matériel qui ait jamais encore été organisée depuis *la première foire internationale du pétrole, la plus vaste, la plus ancienne et la seule au monde.* L'exposition de 1938, qui marquera le 15ème anniversaire de la fondation de la plus grandiose foire du monde consacrée à une industrie isolée, révèlera des progrès quasi-incroyables en rendement, économie, rapidité et sécurité dans les branches de la géophysique, de la production, du raffinage, du transport et de la vente relevant de la grande industrie du pétrole. Le conseil d'administration vous invite cordialement à assister et à participer.

EXPOSITION INTERNATIONALE DU PETROLE
Signé: W. G. SKELLY, Président.

Exposición International del Petréleo de 1938

Al hacer el anuncio de la Exposición International del Petróleo de 1938, los organizadores y la dirección de la "Feria Mundial de la Industria Petrolera" prometen la exhibición más vasta de nuevos métodos, máquinas y material de todas las que se hayan presentado hasta ahora. *Será la exposición internacional del petróleo más grande e importante en la historia de la industria y la única en el mundo de su caracter internacional.* La exposición de 1938, que señalará el décimo quinto aniversario de la fundación de la más grandiosa feria del mundo consagrada a una sola industria, revelará progresos casi increibles en rendimiento, economía, rapidez y seguridad en todas las ramificaciones de la industria: geofísica, producción, refinería, transporte y venta de productos petrolíferos. La junta directiva de esta Exposición le invita a Ud. a asistir y tomar activa participación en ella.

EXPOSICION INTERNACIONAL DEL PETROLEO
Firmado: W. G. SKELLY, Presidente.

TULSA, OKLAHOMA, U.S.A.
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containing adsorbed salts of copper, over which the vapors are passed for desulfuring and deodorizing. There are many other methods in which copper is the essential metal. Day discloses the use of a mixture of copper sulfate and ammonium chloride for sweetening gasoline, preferably mixed with an earthy absorbent. The advantages of the use of copper are principally to avoid the introduction of excess sulfur.

The hydrogenation process is designed for the manufacture of an exceptional yield of gasoline but an incident to the operation is the purifying action, due to the fact that some of the hydrogen combines with sulfur and other impurities, which are removed as constituents of the waste gases. The process is therefore a treating method.

LUBRICATING OILS

The methods now recognized as essential for production of a lubricating oil that will meet requirements of automobiles and aircraft are described as solvent extraction processes, or simply solvent refining. By these methods it is possible to make a variety of lubricating oils of remarkable stability and exceptional viscosity indexes from crude oils differing in origin and quality.

The principle of the extraction process is that the solvents when mixed with the lubricating stocks shall separate under suitable temperature conditions into two phases. The naphthenic compounds are easily soluble, so concentrate in the solvent phase but the less soluble paraffinic substances collect in the second phase. The solvent is usually removed and recovered by distillation. The part of the oil obtained from the solvent phase is known as "extract" and that from the paraffin phase as "raffinate."

An early solvent extraction process was that of Edeleanu, who found that liquid sulfur dioxide, applied at about 14° F., improved kerosene by removing aromatics and sulfur compounds, and that the liquid sulfur dioxide could be recovered to be again used. It was a natural development that this process should early be applied for treatment of lubricating stocks. The oil is chilled to 25° to 32° F. by injecting liquid sulfur dioxide, then pumped into the lower part of a mixing tower where it contacts liquid sulfur dioxide as it rises; the extract layer being continuously drawn off from the bottom and the raffinate passing off near the top of the tower. The extract and raffinate are freed from sulfur dioxide by multi-stage evaporation under increasing temperature and reducing pressure.

The solvent process for dewaxing with a mixture of benzol and acetone was established in 1927. The distillate is pumped in on the top of the solvent mixture of acetone and benzol and thoroughly mixed, chilled and pumped to a tank. It then goes to the wax filters. Both the pressed distillate and slack-wax mixture contain portions of the solvents, so they are pumped to the strippers where part of the solvents are removed by distillation, the residues being a pressed distillate and a low melting point wax. The remaining solvent is recovered by a series of distillations: the residue being the finished oil.

Some features of the acetone-benzol dewaxing process have been adopted by furfural extraction. Extraction takes place in a packed tower in place of the multi-stage operation. The raffinate is separated from the solvent by flash distillation under vacuum and the final trace removed by vacuum steam stripping. The finishing operations may include light acid treatment, contact clay filtration and final dewaxing.

The phenol process consists of a counterflow mixing of oil and phenol through a series of mixers and tanks. The treated oil is run through a pipe still from which the heated oil passes to a bubble tower to remove the phenol, and finally to a vacuum stripper. The solvent phase is cooled and run

lorsqu'on veut obtenir un rendement exceptionnel en essence ou gazoline, mais ce procédé a en outre l'avantage d'exercer une action de purification, par suite du fait qu'une partie de l'hydrogène se combine avec le soufre et les autres impuretés, qui se trouvent ainsi éliminées en même temps que les gaz résiduaires dont elles deviennent solidaires. Ce procédé est donc une méthode de traitement.

HUILES DE GRAISSAGE

Les méthodes actuellement reconnues comme essentielles pour la production d'une huile de graissage qui réponde aux exigences de l'automobilisme et de l'aviation, sont désignées sous le nom de procédés par extraction aux solvants, ou simplement raffinage par solvants. Grâce à l'emploi de ces méthodes, il est possible de préparer tout un choix d'huiles de graissage d'une stabilité remarquable et d'une viscosité exceptionnelle, et cela à partir de pétroles bruts de diverses origines et qualités.

Le principe du procédé par extraction est que les solvants, lorsqu'on les mélange à des huiles lubréfiantes, provoqueront, dans des conditions convenables de température, une séparation en deux phases. Les composés naphténiques sont facilement solubles, par suite se concentrent dans la phase solvant, alors que les substances paraffiniques moins solubles se recueillent dans la seconde phase. On élimine et récupère habituellement le solvant par distillation. La fraction de l'huile qu'on obtient à partir de la phase solvant est désignée sous le nom de "extrait," alors que celle de la phase paraffine se nomme "raffinatum."

Un des premiers procédés d'extraction par solvants a été celui de Edeleanu, qui avait découvert que le gaz sulfureux liquide, appliqué à environ 14° F., améliorait la kérosine en éliminant les composés aromatiques et les composés sulfureux, et qu'on pouvait récupérer et réemployer le gaz sulfureux liquide. Il n'était que naturel qu'on pensât ensuite à appliquer ce procédé au traitement des huiles lubréfiantes. Voici comment on procède pour cela. On refroidit les huiles à 25° ou 32° F. par injection de gaz sulfureux liquide, puis on les pompe à la partie inférieure d'une colonne mélangeuse où elles viennent en contact avec du gaz sulfureux liquide à mesure qu'elles s'élèvent, la couche d'extrait étant continuellement soutirée du fond alors que le raffinatum parvient presqu'au sommet de la colonne. L'extrait et le raffinatum sont débarrassés du gaz sulfureux par une évaporation à multiple effet sous des températures croissantes et des pressions décroissantes.

Le procédé au solvant pour l'extraction de la cire au moyen d'un mélange de benzol et d'acétone a été établi en 1927. On pompe le distillatum au sommet du mélange solvant d'acétone et de benzol, puis on le mélange intimement, on le refroidit et on le pompe dans un réservoir. On l'amène ensuite aux filtres à cire. Tant le distillatum comprimé que le mélange cire-charbon contiennent des portions des solvants, on les pompe donc dans des appareils dits extracteurs où une partie des solvants est extraite par distillation, les résidus étant constitués par un distillatum comprimé et une cire de bas point de fusion. On recupère le solvant restant par une série de distillations, et le résidu alors obtenu est l'huile finie.

Certains aspects du procédé d'extraction de la cire par l'acétone-benzol ont été adoptés pour l'extraction furfurale. Cette extraction a lieu dans une colonne chargée au lieu d'un appareillage à multiple effet. Le raffinatum est séparé du solvant par distillation éclair dans le vide, puis les dernières traces en sont éliminées par extraction à la vapeur dans le vide. On peut faire figurer parmi les opérations de finissage un traitement léger à l'acide, une filtration par contact avec l'argile et une dernière extraction de cire.

Le procédé au phénol consiste à mélanger par courants contraires les huiles et le phénol dans une série de mélanguers et de réservoirs. On fait

fin de aumentar el rendimiento de gasolina, durante la producción; pero, la acción de purificación es aquí un incidente, debido al hecho de que parte del hidrógeno se combina con el azufre y otras impurezas, las cuales se quitan como constituyentes de los gases de escape. El procedimiento es, por lo tanto, un método de tratamiento.

ACEITES LUBRICANTES

Los métodos que ahora se aceptan como esenciales para la producción de un aceite lubricante que satisfaga los requisitos de automóviles y aeroplanos, se describen como procedimientos de extracción, o sencillamente refinación por disolvente. Por estos métodos es posible producir una variedad de aceites lubricantes de notable estabilidad y de excelentes índices de viscosidad, de petróleos crudos de diferentes en orígen y calidad.

El principio del procedimiento de extracción es que los disolventes, cuando se mezclan con los aceites crudos, se separan, bajo adecuadas condiciones de temperatura, en dos fases. Los compuestos de nafta se disuelven fácilmente y se concentran en la fase disolvente, pero las substancias de parafina menos solubles se acumulan en la segunda fase. El disolvente generalmente se quita y recobra por destilación. La parte de aceite obtenida de la fase disolvente se llama "extracto" y la obtenida de la fase de parafina, "refinado."

Uno de los primeros procedimientos de extracción por disolvente fué el de Edeleanu, quien descubrió que el bióxido de azufre líquido, aplicado a más o menos, 14° F., mejoraba la kerosina, quitándole las substancias aromáticas y compuestos de azufre, y que el bióxido de azufre líquido podía recobrarse, para usarse de nuevo. Un resultado natural fué que este procedimiento se aplicará también, al principio, al tratamiento de aceites lubricantes. El aceite es enfriado a una temperatura de 25 a 32° F., mediante inyección de bióxido de azufre líquido; luego se transfiere por bomba a la parte inferior de una torre mezcladora, donde tiene contacto con el bióxido de azufre líquido, al levantarse; la capa de extracto queda saliendo continuamente por el fondo, mientras la de refinado sale por cerca de la parte superior de la torre. El extracto y el refinado se libran de bióxido de azufre por evaporación de múltiple etapa, bajo temperatura creciente y presión de reducción.

El procedimiento por disolvente, para la extracción de cera, con una mezcla de benzol y acetona, fué establecido en 1927. El destilado se introduce, por bomba, encima de la mezcla disolvente de acetona y benzol, mezclándose todo muy bien, enfriándose y transfiriéndose, por bomba, a un tanque o depósito. De aquí pasa a los filtros de cera. Tanto el destilado comprimido como la mezcla sin cera contienen porciones de los disolventes, y por esta razón se pasan por extractores, donde se les quita parte de los disolventes, por destilación. Los residuos son un destilado comprimido y una cera de bajo punto de derretimiento. El disolvente remanente se recobra por una serie de destilaciones y el residuo final es el aceite refinado.

Algunos rasgos del procedimiento de acetona y benzol para quitar la cera se han aplicado a la extracción furfural. La extracción se realiza en una torre cerrada, en lugar del aparato de múltiple etapa. El refinado se separa del disolvente mediante destilación rápida al vacío y el trazo final se quita por extracción de vapor el vacío. Los tratamientos finales pueden incluir leve aplicación de ácido, filtración de contacto con arcilla y separación final de cera.

El procedimiento de fenol consiste en mezclar, mediante corrientes opuestas, el petróleo y el fenol, en una serie de mezcladores y tanques. El aceite tratado se pasa por un alambique tubular y de aquí sale calentado a una torre de burbujeo, donde se le quita el fenol, y finalmente llega a un ex-

to a settling tank. The oil separating is recycled through the extraction unit, and the solvent passes through a phenol recovery unit similar to that used for separating the phenol from the raffinate. The raffinate usually requires nothing more than a clay contact for finishing.

Nitrobenzene is a solvent possessing high solvent power with good selectivity and its weight aids in the formation of the two phases. The extraction takes place in a series of counter-current extractors with interstage mixers. The chilled oil is mixed with the nitrobenzene and forced into the extractor, then proceeds flowing counter-current to fresh nitrobenzene. The final raffinate passes through vacuum evaporators and then to a live steam stripper. Dewaxing is confined to the treated oil. Usually a clay finishing produces a good color.

Another process makes use of two solvents, propane as the dewaxing medium acting in conjunction with the selective solvent, the chief constituent of which is cresylic acid. The process has a high degree of flexibility and may be adapted to different types of oil. The stock first passes through two horizontal contactors, to be blended with cresylic acid and liquid propane. The propane raffinate is discharged at one end and the extract at the other. Difference in boiling points of the extract and raffinate phases permit solvent recovery. The residual oil is heated in a pipe still and then flows through a combination of atmospheric and vacuum towers for the removal of cresylic acid and any remaining traces of propane. In a similar way the extract is finally finished through a still, fractionating, steam stripping and vacuum towers.

Chlorex, dichloroethyl ether, has a high degree of selectivity and the solvent power is sufficient to treat heavy stocks; also, the low viscosity and light weight facilitate separation of the two phases. A four-stage counter-current extraction is suitable for paraffinic stocks and a seven-stage for naphthenic oils. The stock enters a first-stage pipe mixer with chlorex extract from the second stage. From the mixer it goes to a settling tank, from here the extract layer passes to a stripping tower, at the same time the raffinate phase goes through the remaining extraction steps in counter-current to fresh chlorex entering at the last stage. Raffinate and extract are freed from their respective solvents by separate systems of towers, heat exchangers and vacuum towers. The finishing usually includes dewaxing and clay treatment.

Another solvent process operates with crotonaldehyde or acrolein. The first possesses great affinity for naphthenic materials, is stable and almost 100 per cent recoverable. The stock and solvent are passed through mixers to a centrifuge to obtain two phases. From centrifuge No. 1 the solvent phase or spent solvent is discharged to a heater and the oil phase passes to another mixer to be contacted with fresh solvent and again sent to centrifuge No. 2 to be also separated into two phases. The oil phase from this is completely refined.

METALS AND CORROSION

Each year the use of chemicals for combating acid and sulfide corrosion in refineries appears to be in a firmer position. Nevertheless, every corrosive condition is a different problem; some oils are handled best by metals, whereas others require chemical neutralizers. Lime is now almost the standard agent for combating high-temperature sulfide corrosion found in cracking plants and for low-temperature acid corrosion ammonia is widely used.

The usual alloys for withstanding acid corrosion in condensers are admiralty metal for tubes and muntz metal for tube sheets, although several other alloys such as the cupro-nickel alloys (80-20), red brass (85-15), arsenical high brass (0.1 arsenic), and aluminum high brass (2 aluminum) are attracting attention. Admiralty metal suffers

circuler l'huile traitée à travers un alambic tubulaire, d'où l'huile chauffée passe dans une colonne de barbotage pour se débarrasser du phénol, puis se rend finalement dans un extracteur à vide. La phase solvant est alors refroidie et dirigée sur un réservoir de décantation. L'huile qui se sépare reparcourt le cycle à travers le groupe extracteur, et le solvant est alors dirigé sur un appareil de récupération du phénol similaire à celui employé pour séparer le phénol du raffinatum. En général, le raffinatum ne demande pas plus qu'un contact avec de l'argile pour le finissage.

Le nitrobenzène est un solvant qui possède un grand pouvoir solvant ainsi qu'une excellente sélectivité, et son poids aide à la formation des deux phases. L'extraction a lieu dans une série d'extracteurs à courants opposés avec des mélangeurs intercalés. L'huile refroidie est mélangée au nitrobenzène, puis on la fait pénétrer dans l'extracteur, où elle circule en sens contraire de nitrobenzène pur. Le raffinatum final passe à travers des évaporateurs à vide, puis est dirigé sur un extracteur à vapeur active. L'extraction de la cire n'est appliquée qu'a l'huile traitée. En général, un finissage à l'argile produit une bonne couleur.

Un autre procédé fait usage de deux solvants, à savoir le propane comme agent d'extraction des cires concurremment avec le solvant sélectif, dont le principal élément constitutif est l'acide crésylique. Ce procédé se signale par un haut degré de souplesse et peut être adapté aux divers types d'huiles. On fait tout d'abord passer les huiles à travers deux contracteurs horizontaux, afin de les mélanger à l'acide crèsylique et au propane liquide. Le Raffinatum du propane est évacué à une extrémité et l'extrait à l'autre. La différence qui existe entre les points d'ébullition de la phase extrait et de la phase raffinatum permet de récupérer le solvant. On fait chauffer l'huile résiduaire dans un alambic tubulaire, puis on la fait circuler à travers une combinaison de colonnes atmosphériques et à vide afin d'en éliminer l'acide crèsylique et toute trace de propane pouvant rester. D'une manière analogue, on termine le traitement de l'extrait par passage dans un alambic, par fractionnement, puis dans un extracteur à vapeur et des colonnes à vide.

Chlorex, l'éther dichloroéthyle, possède un haut degré de sélectivité, et son pouvoir solvant est suffisant pour traiter les huiles lourdes; en outre, sa faible viscosité et sa faible densité facilitent la séparation des deux phases. Une extraction par contre-courants de quatre étages convient au traitement des huiles paraffiniques, et de sept étages pour celui des huiles naphthéniques. L'huile entre dans un mélangeur tubulaire d'un premier étage contenant de l'extrait chlorex du second étage. A la sortie mélangeur, on la dirige sur un réservoir de décantation; de là la couche d'extrait passe dans une colonne d'extraction, pendant que la phase raffinatum est soumise aux derniers traitements d'extraction, circulant en sens inverse de chlorex neuf qui entre au dernier étage. On débarrasse le raffinatum et l'extrait de leurs solvants respectifs dans des systèmes séparés de colonnes, échangeurs de chaleur et tours à vide. Les derniers traitements comprennent généralement une extraction de cire et un traitement à l'argile.

Un autre procédé à solvant emploie le crotonaldéhyde ou acroléine. Le premier solvant possède une grande affinité pour les composés naphthaniques, est doué d'une grande stabilité et presque 100 pour cent récupérable. L'huile et le solvant sont dirigés à travers des mélanguers à une centrifugeuse qui comporte deux phases. De la centrifugeuse No. 1 la phase solvant ou solvant utilisé est déchargé dans un réchauffeur et la phase huile passe dans un autre mélangeur pour prendre contact avec du solvant neuf, puis on la renvoie à la centrifugeuse No. 2 pour y être aussi séparée en deux phases. La phase huile qu'on obtient ici est complètement raffinée.

tractor de vacío. La fase de disolvente es enfriada y pasada a un tanque de asentamiento. El aceite separado se pasa de nuevo por el extractor, y el disolvente pasa por un aparato de recuperación de fenol, similar al empleado en la separación del fenol del refinado. El refinado generalmente no requiere más que contacto con arcilla para su acabado.

La nitrobencina es un disolvente que posee gran capacidad y buena selectividad. Su peso ayuda mucho en la formación de las dos fases. La extracción se realiza en una serie de extractores de contracorriente con mezcladores de etapas coardinadas. El aceite enfriado se mezcla con nitrobencina y se inyecta en el extractor continuando pasando en corriente contraria a una nueva carga de nitrobenzina. El refinado final pasa por evaporadores el vacío y después a un extractor de vapor caliente. La extracción de cera se confina al aceite tratado. Generalmente un acabado por contacto de arcilla produce un buen color.

Otro procedimiento se vale de los disolventes: el propano, como agente de extracción de cera en combinación con el disolvente selectivo, cuyo constituyente principal es el ácido cresílico. El procedimiento ofrece un alto grado de flexibilidad, pues se puede adaptar a diferentes tipos de aceite lubricante. El material pasa primero por dos mezcladores horizontales, para unirse con ácido cresílico y propano líquido. El refinado de propano se descarga por un extremo y el extracto, por el otro. La diferencia en puntos de ebullición de las fases de extracto y de refinado permiten la recuperación del disolvente. El aceite residual se caliente en alambique tubular y pasa luego por una combinación de torres atmosféricas y de vacío, para la extracción del ácido cresílico y todo trazo remanente de propano. De manera similar, el extracto se refina finalmente en un alambique, fraccionador, extractor a vapor y torres de vacío.

El éter de bicloruro de etilio, llamado clorex, tiene un alto grado de selectividad y su capacidad disolvente es suficiente para tratar los aceites más pesados; también, su baja viscosidad y peso liviano facilitan la separación de las dos fases. Una extracción de contracorriente de cuatro etapas es adecuada a los aceites de parafina, y una de siete etapas, a los aceites de nafta. El material entra a un mezclador tubular de primera etapa con extracto de clorex de la segunda etapa. Del mezclador va a un tanque de asentamiento, de aquí, la capa de extracto pasa a una torre de extracción y, al mismo tiempo, la fase del refinado pasa por las restantes etapas de extracción, con corriente contraria a una nueva carga de clorex que entra en la última etapa. El refinado el extracto se desprenden de sus respectivos disolventes por sistemas separados de torres, cambiadores de calor y torres al vacío. El acabado final incluye generalmente extracción de cera y tratamiento de arcilla.

Otro procedimiento por disolvente funciona con crotonaldehido o acroleína. El primero posee gran afinidad por los materiales de nafta, es estable y puede recuperarse por completo. El material y el disolvente se pasan por mezcladores a una centrífuga donde se producen las dos fases. De la centrífuga No. 1, la fase de disolvente o disolvente gastado se descarga en un calentador y la fase de aceite pasa a otro mezclador, para ponerse en contacto con nuevo disolvente y ser enviado de nuevo a la centrífuga No. 2, para ser separado en dos fases. La fase de aceite de esta separación sale completamente refinada.

METALES Y CORROSION

El empleo de substancias químicas para combatir la corrosión provocada por ácidos y materiales sulfurosos, en las refinerías, parece que acrecienta año tras año. Toda condición corrosiva es, sin embargo, un problema diferente. Ciertos

The New MASON-NEILAN CONTROLLER

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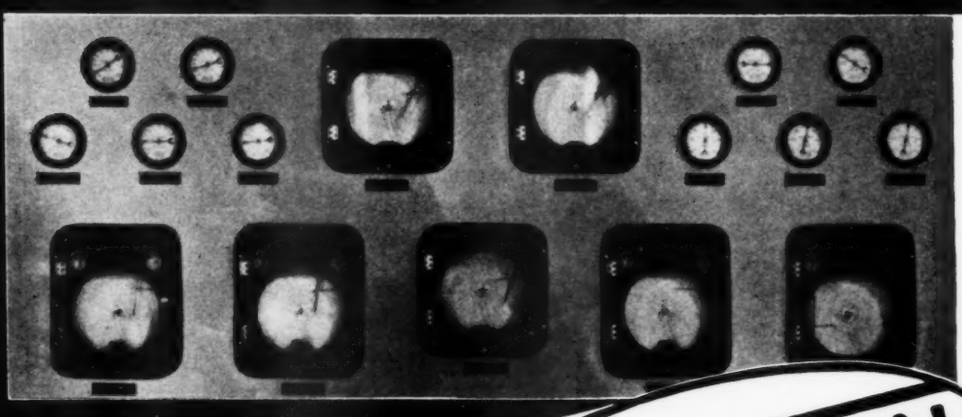

The New Mason-Neilan controller makes it possible to get precise control under all conditions.

All parts are standardized and interchangeable.

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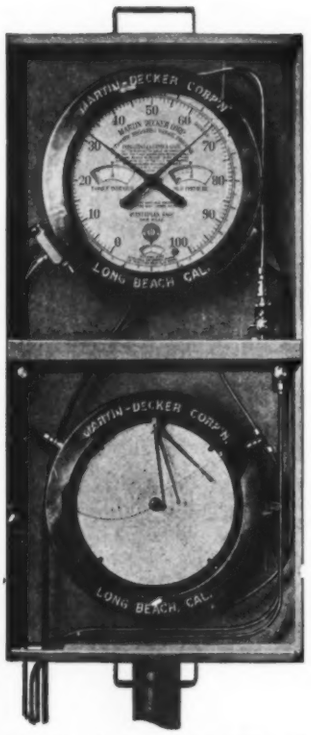


Besides the "Quintuplex" and the "Clipper" Martin-Decker manufactures the following:

Mud Pump Gauge with Automatic Recorder—Drill Pipe Torque Gauge with Automatic Recorder—Rotary Table Tachometer—Traveling Measuring Line Weight Indicator—Automatic Recording Cement Gauge—Rotary Mud Scales with Automatic Recorder. Depth Temperature Bomb—Pump Dynamometer for individually powered Wells—Pull Rod Dynamometer for Group Powered Wells—Gauge Pulsation Damper—Cable Tension Indicator.

The QUINTUPLEX

The Martin-Decker "Quintuplex Drilling Control" is a full range instrument that covers every phase of the drilling operation, on the shallowest or deepest wells, with accuracy and sensitivity. Weight on bottom, load on derrick, slush pump pressure, torque in the drill pipe and rotary table speeds are all shown on one 12-inch dial. Five individual units are installed in one case: Weight Indicator—Super-Sensitive Weight Indicator—Torque Gauge—Slush Pump Gauge and Rotary Table Tachometer. All elements are standard, one in no way interferring with or depending on the functioning of the other, any of them quickly and easily removed and replaced without affecting the operation of any of the others, and each one providing the driller with necessary information for complete control. A single recording gauge records weight, torque and mud pressures on one extra large chart, thus eliminating the installation and maintenance of several recording gauges.

Le "contrôleur de forage Quintuplex" Martin-Decker est un instrument d'amplitude maximum qui englobe toutes les phases de l'opération du forage, sur puits de toutes profondeurs, et cela avec précision et sensibilité. On lit sur un cadran unique de 12 pouces le poids au fond, la charge sur la grue, la pression de pompe à boues, le couple statique dans le tuyau de forage et les vitesses de table rotative. Cinq groupes individuels logés dans un étui unique: Indicateur de poids—Indicateur de poids supersensible—Jauge de couple statique—Jauge de pompe à boues et tachymètre de table rotative. Tous les éléments en sont standard, aucun d'eux ne gênant en rien les autres ou en dépendant pour son fonctionnement, chacun d'eux étant facilement et rapidement démonté et remplacé sans affecter le fonctionnement d'aucun des autres, et chacun d'eux fournissant à l'ouvrier foreur les données nécessaires à un contrôle complet. Un indicateur enregistreur unique inscrit le poids, le couple statique et les pressions de boues sur un graphique unique extra-grand, ce qui élimine l'installation et l'entretien de plusieurs indicateurs enregistreurs.

El "control de perforación Quintuplex" Martin-Decker es un instrumento de amplitud máxima, que engloba todas las fases del trabajo de perforación, en pozo de cualquier profundidad, con suma precisión y sensitividad. Sobre un cuadrante de doce pulgadas se leen el peso al fondo, la carga sobre la grúa, la presión de la bomba de barro, el esfuerzo de rotación en el tubo de perforación y las velocidades de la mesa rotativa. Cinco grupos individuales dispuestos en un solo estuche: indicador de peso, indicador de peso supersensitivo, manómetro de esfuerzo de rotación, manómetro de bomba de barro y taquímetro de mesa rotativa. Todos los elementos son normales. Cada uno funciona sin perturbar a los demás y sin depender de ellos para su operación. Cada uno puede quitarse con facilidad y rapidez, sin afectar el funcionamiento de los otros, e instalarse de igual manera. Cada uno suministra el encargado del trabajo, los datos necesarios para un gobierno completo. Un solo indicador registrador anota el peso, el esfuerzo de rotación y las presiones del barro, en una sola tabla o gráfico, lo que elimina la instalación y el cuidado de varios indicadores registradores.

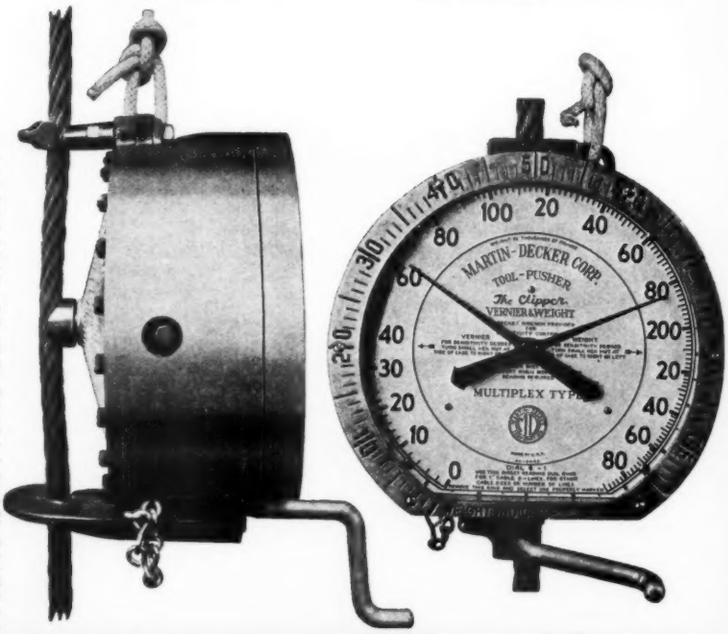
The CLIPPER

THE WEIGHT INDICATOR WITH LABORATORY ACCURACY AND OIL FIELD RUGGEDNESS

The "Clipper" Tool Pusher Weight Indicator is a compact self-contained instrument requiring no installation time other than attaching to the dead line. It is vacuum loaded and sealed at the factory and needs no refilling The "Clipper" is especially suitable for operators not desiring a chart record, where installation time is a factor; for handling tubing rods and casing, setting liners and setting or pulling packers. By the use of quickly interchangeable dial rings, which are nested inside the weather proof gauge, the "Clipper" is made to read directly in pounds, with laboratory accuracy. It is light in weight—weighing only 47 lbs.—compact—occupies less than 1 sq. ft. of space, and rugged, designed of the finest of materials to "take" the abuse of the dead line.

L'indicateur de poids de pousse-outil "Clipper" est un instrument compact et autonome, qui de demande pas d'autre temps pour son installation que celui nécessaire pour le fixer à la ligne morte. Il est chargé à vide et scellé en fabrique, et ne demande pas à être rechargé. Le "Clipper" convient spécialement aux exploitants qui ne tiennent pas à un graphique d'enregistrement, quand le temps d'installation est important; il est prévu pour la manutention des tiges de tubage et revêtements, pour la pose des conduites et pour la pose ou l'extraction des bourrages. Par l'emploi d'anneaux de cadran rapidement interchangeables, qui sont emboités à l'intérieur de la jauge à l'épreuve des intempéries, le "Clipper" est prévu pour lectures directes en livres, avec une précision de laboratoire. Il est léger—ne pesant que 47 lbs.—compact—occupant moins d'un pied carré d'espace, et robuste, fabriqué avec un matériel de choix afin de résister aux mauvais traitements infligés par la ligne morte.

El indicador de peso de empujador de herramienta "Clipper" es un instrumento compacto e independiente, que no requiere para su instalación más tiempo que el necesario para prenderlo a la cuerda muerta. Está cargado al vacío y cerrado en la fábrica y no exige adicional carga. El "Clipper" resulta muy conveniente a los explotadores que no quieren un gráfico de registro, cuando el tiempo de la instalación es importante. Se emplea en conexión con el manejo de vástagos de tubería y revetimientos, para la colocación de conductos y para la colocación o extracción de obturadores. Por el empleo de anillos de cuadrante rápidamente intercambiables, que van embutidos en el interior del manómetro a prueba de la intemperie, el "Clipper" da acusaciones directas en libras, con una precisión de laboratorio. Es de poco peso, pues sólo pesa 47 libras, compacto, pues no ocupa más de un pié cuadrado de espacio. Es de firme construcción y se hace de los mejores materiales, para que resista bien el más severo servicio a que pueda quedar sujeto en la práctica.



Martin-Decker's pledge of never ending research and development is your assurance of accurate, dependable instruments.

THE WEIGHT INDICATOR

MARTIN-DECKER CORPORATION

LONG BEACH CALIFORNIA

San Joaquin Valley: A. F. McQUISTON, Bakersfield, California
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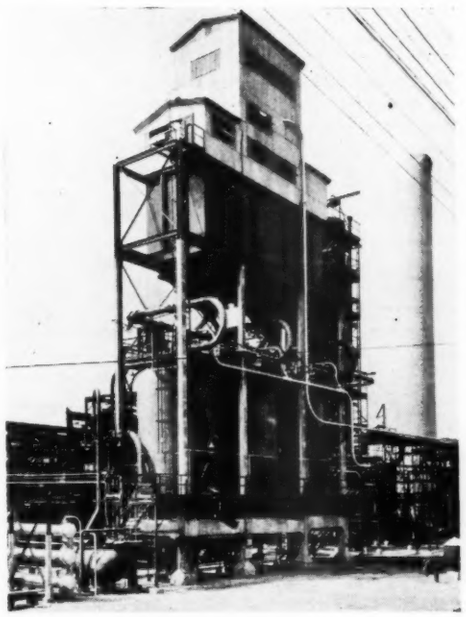
by dezincification which leaves plugs of porous copper in the tubing. About half of the tubing now used is copper-base and the other half ferrous-base. Admiralty lined with copper (with water inside tubes) is also attracting attention. The accepted alloys for sulfide corrosion are the chromium irons, mainly 18-8 chrome nickel (18 Cr. 8Ni. bal Fe) and 5 chromium steel. These materials are also notably strong at elevated temperatures.

The use of 0.5 per cent molybdenum steel for high-pressure high-temperature pipestill tubing is gaining rapidly. The creep strength of the molybdenum steels is notably high for relatively low cost. If sulfide corrosion is also encountered, 5 per cent of chromium with 0.5 molybdenum is used.

The remarkable resistance of the high silica irons has attracted attention for years but these alloys have inferior physical properties. Recently a method of impregnating the surface of ferrous products with a thin coating of high silicon content has been perfected. Such a method, if successful,



Clay handling equipment

will provide a hard, abrasion and corrosion resistant surface of high silica iron backed by a tough high-strength core of steel. Intricate shapes may be fabricated because the final step in the manufacture is the production of the silicon surface.

LABORATORIES

Refinery laboratory work is usually divided into two classes, control and research. All refineries utilize the standard distillation apparatus, vapor pressure bomb, colorimeter, and doctor bottles to control the quality of their gasoline. For more exacting control they employ a knock-testing engine, light stability apparatus, gum filters, etc. The trend is definitely toward more elaborate and more exacting motor fuel testing equipment. The same is true for kerosene and all classes of burning oils, particularly in investigation of light diesel oils. Within a few years control of the anti-knocking properties of diesel fuels may become as exacting as for gasoline.

Through the introduction of solvent refining on a large scale for the manufacture of lubricants, interest in testing methods has been greatly increased. The most delicate "oiliness" machines have been adopted by important refiners to investigate the lubricating properties of their oils while other major refiners have chosen to avoid using any test other than actual road tests.

Bearing corrosion has been made an important issue among certain refiners and automobile manu-

LES METAUX ET LA CORROSION

D'année en année, l'emploi des produits chimiques pour combattre la corrosion provoquée par les acides et les matiéres sulfureuses prend une importance croissante dans les raffineries. Chaque cas de corrosion n'en reste pas moins un problème individuel; certains pétroles s'accommodent parfaitement des métaux pour leur manipulation, alors que d'autres exigent l'emploi d'agents chimiques neutralisants. La chaux est devenue l'agent le plus couramment employé pour lutter contre la corrosion sulfureuse à haute température, qu'on observe dans les usines pratiquant le "cracking"; quant à la corrosion acide à basse température, c'est généralalement par l'emploi de l'ammoniaque qu'on s'en rend maître.

Les alliages auxquels on a le plus souvent recours dans les condenseurs pour résister à la corrosion des acides sont le métal dit "admiralty" pour les tubes et le métal dit "muntz" pour les tôles de tube, bien que plusieurs autres alliages aient aussi retenu l'attention, tels que les alliages de cuivre et nickel (de 80-20), le laiton rouge (de 85-15), le laiton arsénieux (0,1 en arsenic), et le laiton d'aluminum (avec 2% d'aluminum). Le métal "admiralty" s'altère souvent par perte de son zinc, ce qui laisse dans la tuyauterie des tampons de cuivre poreux. A l'heure actuelle, environ la moitié de la tuyauterie employée est à base de cuivre et l'autre moitié à base de fer. Le métal "admiralty" avec revêtement de cuivre (avec eau à l'intérieur des tubes) retient aussi l'attention de beaucoup. Les alliages reconnus pour résister à la corrosion sulfureuse sont les fers au chrome, notament le nickel-chrome de 18-8 (18 de chrome, 8 de nickel et le reste de fer) et l'acier chromé (5 de chrome). Ces alliages se signalent aussi par leur remarquable resistance aux températures élevées.

L'emploi de l'acier à 0,5% de molybdène, pour la tuyauteria d'alambics ou serpentins exposés à de fortes pressions ou à de hautes températures, gagne rapidement du terrain. Le pouvoir capillaire des aciers au molybdène est nettement supérieur par rapport à son prix relativement peu élevé. Dans les cas ou la corrosion sulfureuse est également présente, on a recours à un alliage d'acier avec 5% de chrome et 0,5% de molybdène.

La résistance remarquable des fers à forte teneur de silice est connue de longue date, mais on a toujours déploré les propriétés physiques inférieures de ces alliages. Ce n'est que tout récemment qu'on a réussi à mettre au point une méthode qui consiste à imprégner la surface de produits ferreux d'une couche mince ou revêtement de haute teneur en silicium. Si cette méthode est correctement appliquée, on obtient une surface tenace, d'une grande résistance à l'abrasion et à la corrosion, à forte teneur de silicium, qui prend appui sur un noyau d'acier de ténacité et robustesse élevées. Cette méthode peut se prêter à la fabrication de pièces de toutes les formes imaginables, vu que l'application du revêtement au silicium est la dernière phase de la fabrication.

LABORATOIRES

Les travaux de laboratoire de la raffinerie se divisent généralement en deux catégories, le contrôle et les recherches. Toutes les raffineries utilisent l'appareil de distillation standard, la bombe à pression de vapeur, le colorimètre et les flacons indicateurs pour le contrôle de la qualité de leur essence. Afin d'assurer un contrôle plus précis, ils ont encore recours à un moteur d'essai de détonations, un appareil de stabilité lumineuse, des filtres de résidus gommeux, etc. On observe à l'heure actuelle une tendance marquée à employer un matérial plus précis et plus perfectionné pour dé-

petróleos se manejan mejor con metales, mientras otros requieren neutralizadores químicos. La cal es ahora el agente casi normal para combatir la corrosión sulfúrea, proveniente de la alta temperatura, que se presenta en las plantas de procedimiento "cracking"; y para combatir la corrosión ácida de baja temperatura, se emplea mucho el amoniaco.

Las aleaciones corrientes para resistir la corrosión ácida en condensadores son el metal llamado "admiralty" para tubos y el metal "muntz" para láminas de tubo, a pesar de que hay también varias otras aleaciones, que están atrayendo la atención, incluyéndose entre ellas las de cobre y níquel (de 80-20), el latón rojo (de 85-15), el latón arsenical (con 0,1 de arsénico) y el latón de aluminio (con 2% de aluminio). El metal "admiralty" está expuesto a separación de cinc, lo que produce orificaciones de cobre poroso en la tubería. Casi la mitad de la tubería actualmente empleada tiene base de cobre, con la otra mitad, por lo general, de base ferrosa. El metal "admiralty" con forro de cobre (con agua dentro de los tubos) está también atrayendo atención. Las aleaciones aceptadas para evitar la corrosión sulfúrea son las de hierro y cromo, principalmente la de cromo y níquel de 18-8 (18 de cromo, 8 de níquel y el resto de hierro), y la de acero con 5 de cromo. Estos materiales son también notablemente resistentes a elevadas temperaturas.

El empleo del acero con 0,5% de molibdeno, para tubería de alambiques o serpentines sujetos a gran presión y alta temperatura, está generalizándose con rapidez. La resistencia inherente de las aleaciones de acero y molibdeno es notablemente ventajosa en relación con su moderado costo. Para la corrosión sulfúrea se emplea también una aleación de acero con 5% de cromo y 0,5% de molibdeno.

La extraordinaria resistencia de las aleaciones de hierro y silicio han llamado la atención desde hace años, pero, por tener inferiores propiedades físicas, no resultan convenientes. Recientemente se ha perfeccionado un método para la impregnación de la superficie de productos ferrosos con una leve capa o revestimiento de alto contenido de silicio. Semejante método, de resultar satisfactorio, puede proveer una superficie dura, de gran resistencia al desgaste y corrosión, de hierro con alto contenido de silicio, reforzada por un núcleo de acero de mucha firmeza y duración. Este método puede prestarse a la fabricación de piezas de cualquier forma, quedando el revestimiento de silicio como el último paso en la manufactura.

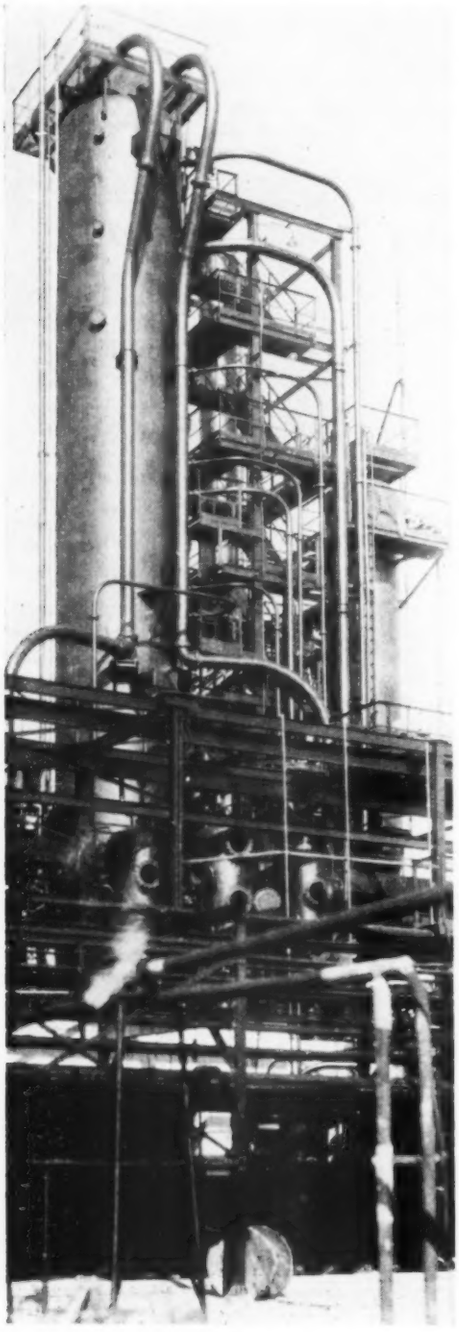
LABORATORIOS

El trabajo de laboratorio de la refinería se divide generalmente en dos clases: control o gobierno, y estudio o ivestigación. Todas las refinerías utilizan el aparato de destilación normal, la bomba de presión de vapor, el colorímetro y las botellas indicadoras para controlar la calidad de la gasolina. Para un control más exacto, emplean un motor de ensayo de detonación o golpeteo, un aparato de estabilidad lumínica, filtros re residuos gomosos, etc. Se presenta ahora la tendencia hacia equipos de ensayo más precisos y completos, para determinar las propiedades de los combustibles más refinados. Lo mismo se aplica a la kerosina y otras clases de combustibles ordinarios, y muy en particular a los petróleos livianos para motor diésel. Dentro de pocos años, el control de las propiedades antidetonantes de los combustibles diésel se hará tan exigente como el de la gasolina.

Debido a la introducción de la refinación por disolvente, en grande escala, para la preparación de lubricantes, se ha acrecentado mucho el interes en los métodos de ensayo. Importantes refinadores han adoptado las más delicadas máquinas para determinar la "oleaginosidad" y estudiar las propiedades lubricativas de sus aceites, mientras otros grandes productores han optado por desatenerse semejantes ensayos, ateniéndose única-

facturers and this factor has influenced the laboratory procedure when testing lubricants. Elaborate control tests have also been instituted to cover the purchase of acid, clay, caustic bags and even the steel.

In the research laboratories considerable work has been devoted to rendering gasolines light-stable, to improving burning characteristics of kerosene by modifying existing treating methods



Combination unit

and to preparation of lubricants by selective solvent action. In a few of the largest laboratories polymerization, with emphasis upon the use of catalysts, has taken up a major share of the research program.

POWER PLANT

Depending on size, type of operations, water supply and fuel costs, power requirements and applications at refineries vary widely. Steam, oil and gas in the order named are the most important fuels used in the generation of power. In most cases outside purchases of electrical power

terminer les propriétés des carburants de moteurs. Ceci s'applique également à la kérosine ou pétrole lampant et à tous les genres d'huiles combustibles, en particulier dans l'analyse des pétroles ou huiles légères pour moteurs Diesel. Dans le courant de quelques années, on arrivera à contrôler les propriétés antidétonantes des carburants Diesel avec une précision aussi grande que pour l'essence.

Par l'introduction dans la fabrication des lubréfiants du raffinage par solvants sur une grande échelle, les méthodes de contrôle sont devenues populaires auprès des raffineurs. Les plus importants de ces raffineurs ont adopté des machines d'une grande précision pour déterminer le "pouvoir huileur" et étudier les propriétés lubréfiantes de leurs huiles, alors que d'autres raffineurs importants ont préféré n'employer d'autres épreuves que celles en pratique ou épreuves sur route.

La corrosion des paliers a été un important sujet de discussion parmi certains raffineurs et certains fabricants d'automobiles, et ce facteur a eu une influence directe sur la méthode d'essai au laboratoire des lubréfiants. On a également adopté des essais de contrôle très stricts à l'achat des acides, de l'argile, des produits caustiques, des sacs et même de l'acier.

Dans des laboratoires de recherches, de nombreux travaux ont été conduits en vue d'assurer la stabilité aux essences légères, d'améliorer les caractéristiques de combustion de la kérosine ou pétrole lampant, en modifiant les méthodes de traitement en existence, et, enfin, en vue de préparer des lubréfiants par action de solvants appropriés. Dans quelques-uns des plus importants laboratoires, c'est la polimérisation, avec préférence marquée pour l'emploi des catalyseurs, qui a eu la plus grande place dans les travaux de recherches.

CENTRALE D'ENERGIE

Selon l'importance et le type des opérations, et aussi selon l'alimentation en eau et les frais de combustible, les besoins et les applications de la force motrice dans les raffineries varient dans de fortes proportions. La vapeur, le pétrole et le gaz sont, dans l'ordre d'énumeration, les plus importants combustibles employés pour générer la force motrice. Dans la plupart des cas, les achats extérieurs d'energie électrique sont complémentaires, la plus grande part de l'énergie nécessaire étant générée par les raffineries elles-mêmes.

On a besoin de vapeur pour le traitement et pour la génération d'énergie électrique, de nombreuses pompes actionnées à la vapeur étant encore en usage. A cause des économies réalisées dans les centrales d'énergie du nouveau type, on observe dans l'industrie une tendance générale à faire l'installation de chaudières de haute pression qui peuvent atteindre des pressions de 900 lbs. Ces chaudières sont reliées à des turbines dans la génération d'énergie électrique. L'échappement des turbines est disponible pour les traitements de raffinage. Une grande centrale d'énergie installée dans une raffinerie au cours de cette année consiste de trois chaudières à 125.000 lbs. par heure, reliées à trois turbines à vapeur de 4.000 KW du type sans condensation de vapeur. Ce groupe est à même de fournir une grande partie de l'énergie nécessaire à l'exploitation de la fabrique, tout en fournissant la vapeur demandée par les diverses phases du raffinage. Les chaudières employées à cette raffinerie typiques de la tendance générale dans la branche, comportent trois tubes coudés avec parois d'eau pleines disposées sur les côtés du foyer et de la façade supérieure. Les générateurs sont des machines à 5.000 k.v.a., triphase, 60 périodes, 2.400 volts, et les incitateurs reliés directement ont un régime normal de 25 KW à 125 volts.

On emploie de plus en plus les moteurs électriques dans les opérations de raffinerie, ce qui aug-

mente a la experiencia práctica en el camino.

La corrosión de los cojinetes ha sido un importante tema de discusión entre ciertos refinadores y fabricantes de automóviles, y esta circunstancia ha tenido influencia directa en los procedimientos de laboratorio seguidos para el ensayo de lubricantes. Se han implantado también exigentes ensayos en conexión con la compra de ácidos, arcilla, materiales cáusticos, sacos y aun acero.

En los laboratorios de investigación se ha dado particular atención a la estabilidad de las gasolinas, a las características de combustión de la kerosina, modificando los existentes métodos de tratamiento, y a la preparación de lubricantes por acción disolvente selectiva. En algunos pocos de estos importantes laboratorios, se ha dado suma atención a la polimerisación auxiliada principalmente por catalizadores.

CENTRAL DE ENERGIA

Las necesidades y las aplicaciones de la fuerza motriz, en las refinerías, varían mucho, de acuredo con la importancia y el tipo de las operaciones y de acuerdo también con la alimentación de agua y los gastos de combustible. El vapor, el petróleo y el gas son, en el orden indicado, los combustibles más importantes que se usan para la generación de la fuerza mortíz. En la mayor parte de los casos, las compras exteriores de energía eléctrica, son complementarias, pues casi toda la energía necesaria se genera en las mismas refinerías.

Hay necesidad de vapor para el tratamiento y para la generación de energía eléctrica, a causa del gran número de bombas que todavía se accionan con la ayuda de vapor. A causa de las economías realizadas en las centrales de energía de nuevo tipo, se observa en la industria una tendencia general a la instalación de calderas de alta presión, que pueden alcanzar presiones hasta de 900 libras. Estas calderas se conectan a turbinas, para la generación de energía eléctrica. El vapor de escape de las turbinas se aprovecha en los tratamientos de refinería. Una gran central de energía, instalada en una refineria norteamericana, durante el presente año, consta de tres calderas de 125.000 libras por hora, unidas a tres turbinas de vapor de 4.000 kilovatios, del tipo sin condensación de vapor. Este grupo, además de suministrar casi toda la energía necesaria para el trabajo de toda la planta, suministrará también todo el vapor que se necesitará para las diferentes fases de la refinación. Las calderas empleadas en esta refinería, típicas de la tendencia general en el ramo, son del tipo de tres tubos acodados, con paredes llenas de agua, dispuestas a los lados del hogar y en la sección delantera superior. Los generadores son máquinas de 5.000 k.v.a., trifásicas, de 60 períodos, de 2.400 voltios, y los excitadores conectados directamente, tienen un régimen normal de 25 kilovatios a 125 voltios.

Continúa aumentando el empleo de motores eléctricos, en trabajos de refinería, lo que impone un mayor consumo de corriente eléctrica. Esto se debe, en parte, al uso más frecuente de bombas centrifugas y al perfeccionamiento de los motores a prueba de explosiones. Se puede decir que casi todos los tipos de combustibles se aprovechan ahora para la generación de vapor, incluyendo el petróleo, el gas natural, el gas de refinería, el carbón y el coque. Se observa mucho progreso en la mezcla de combustibles residuarios, lo mismo que en la construcción de quemadores para estos combustibles ,que antes se perdían, por no poder aprovecharse. Estos combustibles residuarios, que contienen ácidos y otras substancias químicas, están aumentando en cantidad, y su utilización, en las centrales de energía, es, a menudo, un factor importante en el funcionamiento económico de una refinería. Un buen número de explotadores han adoptado una instalación de calderas, que permite la utilización de dos o más clases de combustibles.

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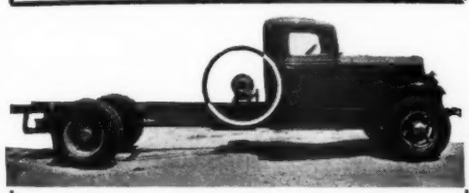

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NATIONAL Seamless is pierced from a solid billet of steel, which assures uniform wall strength, transversely and longitudinally. It is made by the largest manufacturer of seamless pipe in the world, controlling every step from ore to finished product —therefore no divided responsibility. Let our engineers explain to you the full meaning of "Walls Without Welds."

Hoy se conduce gas natural desde Tejas, en el extremo sur de los Estados Unidos, hasta Detroit, centro de la industria automovilista, cerca del Canadá, por la tubería de gas más larga que se haya tendido nunca. El último tramo, de 370 kilómetros de tubos sin costura NATIONAL de 56 cm. de diámetro, ha empatado cerca de Indianápolis con la tubería antes construída, y ya está funcionando.

Como los tubos son sin costura, se tendieron sin el peligro ni el temor de que se abriesen longitudinalmente por consecuencia de los esfuerzos debidos a choques, encorvaduras y otras causas análogas durante la instalación. Lo dúctil de los tubos, su alta resistencia a la tracción, la ligereza de su peso, su gran longitud y la facilidad de unirlos por juntas suaves se aunaron para disminuir el trabajo y los gastos de esta importante obra.

Los tubos sin costura NATIONAL se hacen por la perforación de tochos macizos de acero, con lo cual se obtiene uniformidad en su resistencia, tanto longitudinal como transversal. Los fabrica la mayor empresa del mundo dedicada a la producción de tubos sin costura, empresa que dirige ella misma todas las operaciones desde que el mineral sale de la mina hasta la entrega del producto acabado. No hay pues división de la responsabilidad. Deje usted que nuestros técnicos le expliquen detalladamente todas las ventajas que se sintetizan en la simple expresión "Tubos sin soldadura."

Le gaz naturel du Texas s'écoule maintenant à Detroit, la grande cité de l'automobile, sur la plus grande portée qu'ait jamais atteint une conduite de gaz. Le dernier tronçon—370 kilomètres de tubes NATIONAL sans soudure pour conduites, de 56 cm.—relié à la conduite principale près d'Indianapolis, vient d'être terminé et mis en service.

Ces tubes pour conduites étant sans soudure, on n'a pas eu à craindre qu'ils se fendent lorsque les difficultés d'installation entraînent des courbes, chocs, etc. Une résistance élevée à la traction, la ductilité, les grandes longueurs de tube, le poids léger et la possibilité d'effectuer des joints lisses ont tous contribué à diminuer le coût d'installation et à faciliter l'achèvement de cette importante entreprise.

Les tubes NATIONAL sans soudure sont formés de billettes massives percées au moyen d'un mandrin en acier, ce qui leur assure une résistance de paroi uniforme, transversalement et longitudinalement. Ils sont fabriqués par le plus grand fabricant de tubes sans soudure du monde entier, qui contrôle chaque opération de fabrication, depuis le minerai jusqu'au produit fini—donc il n'y a pas de responsabilité devisée. Permettez à nos techniciens de vous expliquer toute la signification de la devise: "Parois sans soudure."

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are supplementary, the bulk of the power being generated within the plants.

Steam is required for processing and in the generation of electrical power with many steam-driven pumps still in use. Due to the economies available in new power plants there is a general trend toward the installation of high-pressure boilers operating at pressures up to 900 pounds. These are connected to turbines in the generation of plant power. The exhaust from the turbines is available for plant processing. A large power plant installed at a refinery this year consists of three 125,000 pounds per hour boilers connected to three 4,000 k.w. noncondensing steam turbines. This will furnish a large part of the power required for plant operation with steam available for the various phases of refinery processing. The boilers at this plant, indicative of the trend in design, are the three bent tube type with full water walls on the furnace sides and the upper front. The generators are 5,000 k.v.a., three phases, 60-cycle, 2,400-volt machines and the direct connected inciters are rated 25 k.w. at 125 volts.

Motors are used more and more in refinery operations increasing the electric power requirements. This is due in part to the increasing use of centrifugal pumps and the perfection of explosion-proof motors. Practically every type of fuel is used in the generation of steam including oil, natural gas, refinery gas, coal and coke. Considerable progress is reported in the blending of waste fuels and the design of burners so that fuels formerly wasted can be used. These waste fuels, containing acids and other chemicals, are increasing in volume and their use in power plants often times is an important factor in the overall efficiency of a refinery. Many operators design their boiler plants to use two or more fuels.

Water treatment is highly important in steam plant operations at refineries. Due to the fact that the bulk of the steam generated is used in plant processing there is relatively little condensate available and make-up water requirements usually run from 80 to 90 per cent of the total steam demand. Properties of water vary widely and treatment covers most of chemical operations available.

There are a few diesel and gas engine installations at refineries. They have usually given satisfactory operating results and probably would be used on wider scale were it not for the fact that steam has to be available at refineries for plant processing.

EVALUATION OF CRUDES

Because of the ease with which crude oils may be economically transported from widely scattered producing areas to major refining centers and because of the growing practice of building small plants in new oil producing fields many refiners and designers of equipment have developed laboratory procedures which will quickly and accurately predict commercial-scale refined oil yields and reflect the nature of the finished products.

Ordinary glass laboratory distillation equipment of one gallon capacity has been found adequate to indicate the commercial yield of straight-run gasoline, kerosene and furnace oils.

The estimated yield of individual lubricants is best determined by vacuum distillation of the residuum in a 5-gallon electrically heated steel still. The individual fractions removed are chemically treated, neutralized, dewaxed, redistilled and filtered to offer the best index of plant results.

Yields from cracking can be most accurately depicted on a small scale operation by processing a minimum of 1 barrel of the stock daily using a miniature model of the commercial unit. Such units have been developed to operate continuously for many days to indicate not only yields under varying methods of operation but to offer exacting data regarding the octane value to be expected for the commercial production of motor fuels by the same method.

mente la demande en courant électrique. Ceci est dû en partie à l'emploi de plus en plus fréquent des pompes centrifuges et au perfectionnement des moteurs à l'épreuve des explosions. On peut dire que presque tous les types de combustible sont employés pour générer la vapeur, y compris le pétrole, le gaz naturel, le gaz de raffinerie, le charbon et le coke. A signaler des progrès marqués dans le dosage des combustibles résiduaires, ainsi que la construction de brûleurs à même de brûleur les combustibles autrefois perdus. Ces combustibles résiduaires, qui contiennent des acides et autres produits chimiques, augmentent en volume, et leur emploi dans les centrales d'énergie est souvent un facteur important dans la conduite économique d'une raffinerie. Bien des exploitants ont adopté un type de groupe-chaudières permettant d'employer deux genres de combustibles ou plus.

Le traitement de l'eau est de la plus grande importance dans les opérations des groupes-chaudières aux raffineries. Par suite du fait que la majeure partie de la vapeur générée est utilisée dans les traitements de raffinage, il y a relativement peu de produit condensé disponible et les besoins globaux en eau atteignent en général de 80 à 90 pour cent de la demande totale en vapeur. Les propriétés de l'eau varient dans de fortes proportions et le traitement englobe la plupart des opérations chimiques possibles.

On signale l'existence de quelques installations à moteurs Diesel et à essence dans les raffineries. Elles ont donné entière satisfaction, dans la majorité des cas, et seraient probablement d'un emploi plus répandu si ce n'était le fait qu'on a besoin de vapeur dans les raffineries pour les traitements de raffinage.

EVALUATION DES PETROLES BRUTS

Par suite de la facilité avec laquelle les pétroles bruts peuvent être transportés économiquement des régions de production fortement dispersées aux principaux centres de raffinage, et à cause de la pratique de plus en plus fréquente de construire de petites raffineries dans de nouveaux champs pétrolifères, un grand nombre de raffineurs et de constructeurs de matérial ont perfectionné des procédés de laboratoire qui permettent de prédire avec célérite et précision les rendements en produit de raffinage, sur une échelle commerciale, tout en reflétant le caractère des produits finis.

Le matérial de distillation courant, en verre, pour laboratoire, d'une capacité d'un gallon, s'est montré satisfaisant pour déterminer le rendement commercial de l'essence distilée, de la kérosine et des huiles de fourneau.

Le rendement approximatif des lubréfiants individuels se détermine le plus facilement en distillant le résidu par le vide dans un alambic en acier de 5 gallons, chauffé par l'électricite. Les fractions séparées qu'on obtient sont soumises à un traitement chimique, on les neutralise, on en extrait la cire, on les distille de nouveau, enfin on les filtre. En procédant de cette manière, on a une indication digne de foi des résultats auxquels on peut s'attendre à la raffinerie.

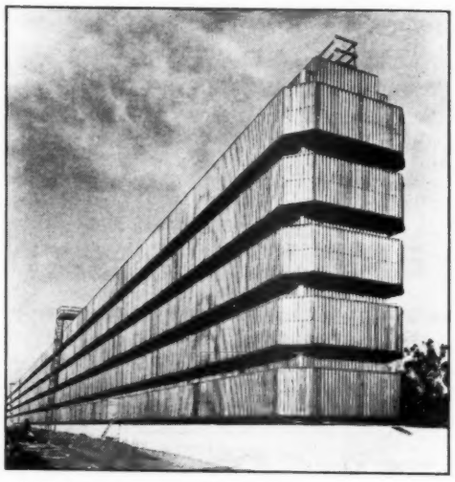
Le rendement du procédé du cracking peut être déterminé avec un maximum de précision, sur une petite échelle, en traitant un minimum d'un baril de pétrole brut d'extraction courante, employant à cet effet un modèle miniature de l'installation commerciale. On a mis au point des groupes d'essai de ce genre qui peuvent fonctionner plusieurs jours de suite sans arrêt, ce qui permet non seulement de déterminer les rendements des diverses méthodes de traitement, mais encore fournit des données exactes sur l'indice octane auquel on peut s'attendre dans la production commerciale des carburants de moteurs préparés par la même méthode.

en los trabajos de las instalaciones de caldera de refinerías. A causa del hecho de que la mayor parte del vapor generado se utiliza en los tratamientos de la refinación, queda relativamente muy poca agua de condensación disponible, y las necesidades totales de agua llegan, generalmente a representar del 80 al 90 por ciento de la demanda total de vapor. Las propiedades del agua varían, por supuesto, mucho, y su tratamiento comprende casi todas las operaciones químicas existentes.

Se observa la presecia de algunas instalaciones de motores diésel y de motores de gas, en las refinerías. En la mayor parte de los casos, están dando completa satisfacción, y seguramente tendrían una aplicación más extensa, si no fuera por el hecho de que hay urgente necesidad de abundante abastecimiento de vapor en las refinerías, para sus procedimientos diarios corrientes.

AVALUO DE LOS PETROLEOS CRUDOS

Debido a la facilidad con que los petróleos crudos puedan transportarse económicamente de sus alejados yacimientos a importantes centros de refinación, y a causa de la creciente práctica de construir pequeñas refinerías en nuevos campos



Cooling tower

petrolíferos, muchos refinadores y constructores de equipo han ideado procedimientos de laboratorio, que predicen con rapidez y exactitud, los rendimientos de producto refinado, sobre una base comercial, reflejando, al mismo tiempo, el carácter de estos productos refinados.

El equipo de destilación sencillo de vidrio, de laboratorio, con capacidad de un galón, ha resultado adecuado para la indicación del rendimiento comercial de gasolina destilada, kerosina y petróleos de quemar.

El rendimiento aproximado de lubricantes individuales se determina mejor por la destilación al vacío del resíduo en un alambique de acero, de 5 galones, calentado eléctricamente. Las fracciones individuales separadas se someten a tratamiento químico, se neutralizan, se separan de la cera, se destilan de nuevo y finalmente se filtran. De este modo ofrecen la mejor indicación de los resultados de la planta.

Los rendimientos del procedimiento de cracking puedan reproducirse con suma exactitud, en pequeña escala, tratando, como mínimo, un barril diaro del petróleo crudo, empleando para esto un modelo en miniatura del equipo comercial. Se han perfeccionado modelos de esta clase, que funcionan contínuamente por muchos días, para indicar no sólo los rendimientos bajo variables métodos de tratamiento, sino para ofrecer también datos exactos acerca del valor en octanos que puede anticiparse de la producción comercial de combustibles de motor producidos por el mismo método.

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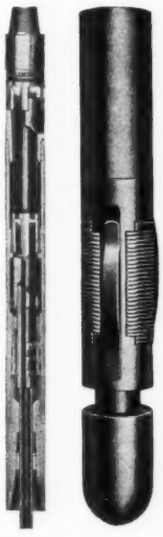

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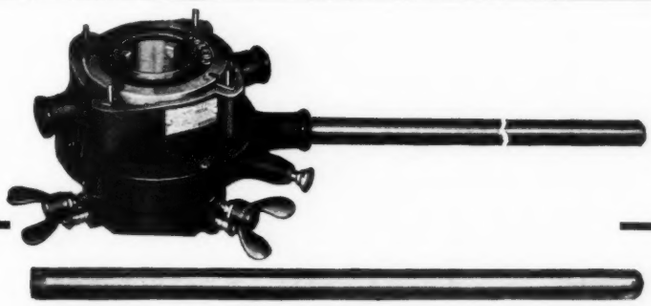

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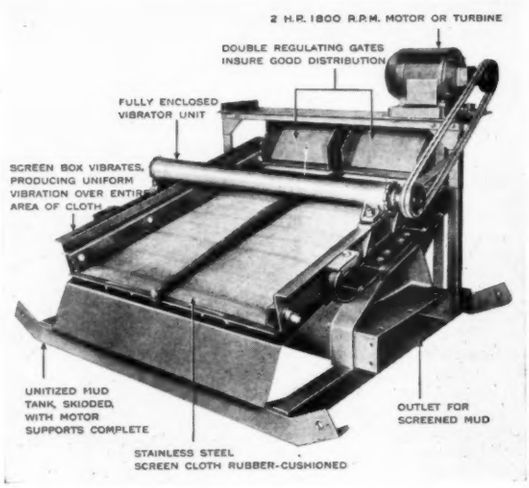
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SCREEN BOX VIBRATES, PRODUCING UNIFORM VIBRATION OVER ENTIRE AREA OF CLOTH
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The Best Way to Recondition Rotary Mud

Clean mud of uniform consistency and weight can be maintained automatically with the Link-Belt Vibrating Screen. This efficient unit rejects shale and clay cuttings from the mud as it flows over the screen surface on its way to the slush pit, and eliminates a large proportion of fine sand and shale as well. The action of the screen also thoroughly degasses and reconditions the mud for re-use without loss of good mud or a reduction in its viscosity.

La mejor manera de reacondicionar el barro de la rotatoria

Un barro limpio, de uniforme consistencia y peso, puede mantenerse automáticamente con la criba vibratoria Link-Belt. Este eficaz equipo rechaza las partículas de esquisto y arcilla del barro mientras va pasando sobre la superficie de la criba en la dirección del pozo. Quita también una buena proporción de la arena y esquisto fino. La acción de la criba desaloja el gas y reacondiciona muy bien el barro para volverse a usar, sin pérdida de su buena parte o reducción en viscosidad.

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Par l'emploi du Tamis Vibrateur Link-Belt, on peut assurer automatiquement la récupération de boues exemptes d'impuretés, dont la consistance et la densité sont uniformes. Au passage de ces boues à la surface du tamis, sur leur parcours à destination de la fosse à boues liquides, cet appareil efficace en rejette les rognures de glaise et d'argile schisteuse, éliminant du même coup une forte proportion de sable fin et d'argile schisteuse. Le mouvement du tamis a aussi pour effet de dégazer et de régénérer à fond les boues en vue de leur réemploi, et cela sans pertes de bonnes boues ou diminution de leur viscosité.

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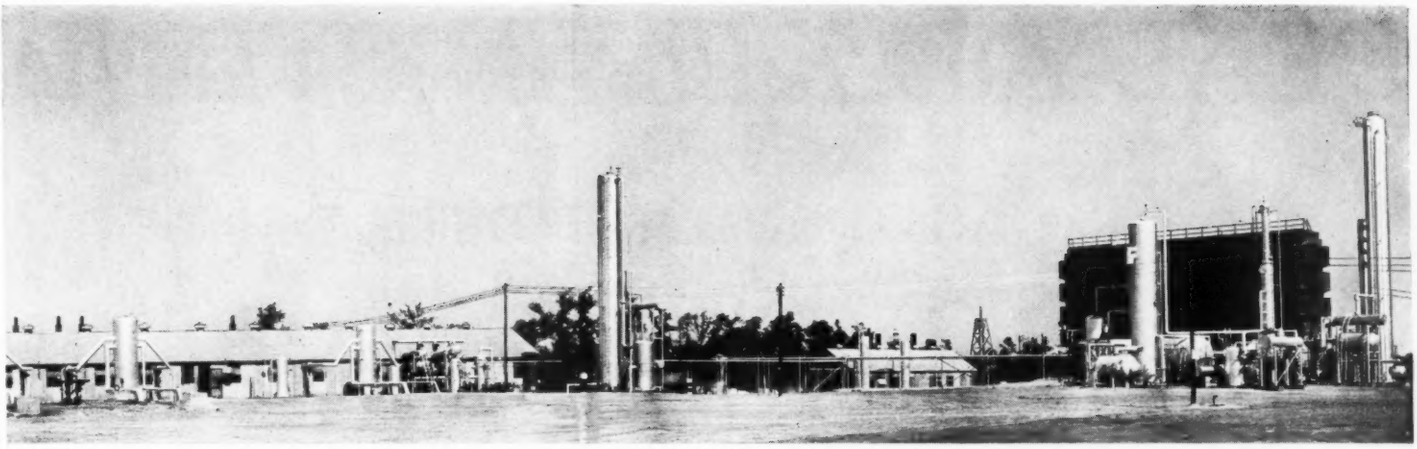
LINK-BELT VIBRATING SCREEN

5847



Natural Gasoline

In the past five years, due to changing general economic conditions, the natural gasoline division of the petroleum industry has had to modify its practices more than any other. Its dependence upon the oil production division for supplies of gas for processing has caused its operation to be affected by governmental and self-imposed regulation of crude production. Obviously, since this regulation applied principally to the new flush areas, plant construction has been retarded somewhat.

The program has called for application of improved engineering practices to effect a more orderly development of these fields and the mutual desire of all and the purpose of the program in its entirety has been to conserve our natural resources. More specifically stated, the improved practice required the conservation of natural gas pressures and through the maintenance of definite oil and gas production ratios, the quantity of gas that has been made available to gasoline manufacturers, has been substantially below what it could have been. The effect of this regulation occasioned a drop in natural gasoline production from a peak of 52,631,000 barrels in 1930 to 33,810,000 barrels in 1933. In the earlier year natural gasoline represented 12 per cent of the total volume of motor fuel produced in the United States, whereas in 1933 the output represented only 8 per cent of the total. At present it accounts for about 9 per cent of the total output.

WELL PRESSURE PLANTS

Within the past year there has been a broader field supplied for installation of well-pressure plants because of the greater depth oil operators are going to find oil. These well-pressure plants avoid the cost of compressor equipment at first and through the use of highly efficient absorbers and stabilizing equipment are able to produce natural gasoline very cheaply. In fields where new well-pressure plants are located additional heater coils are often incorporated in the plant design to process the distillate that usually accompanies the gas as it is first produced. Where this distillate is available, the cost of manufacturing natural gasoline is abnomally low.

PLANT DESIGN

In regard to the design of the individual plants a survey of new construction shows an increasing number of vapor-rectification plants are being built. This process fractionates the natural gas without the intermediate absorption stage. It is

Essence Naturelle

Dans le courant des cinq dernières années, par suite de changements survenues dans les conditions économiques générales, la division de l'essence naturelle de l'industrie du pétrole s'est trouvée amenée à modifier ses pratiques plus que toute autre division. Sa dépendance de la division de production du pétrole pour les fournitures de gaz à traiter a fait que son exploitation a été soumise à un contrôle en partie gouvernemental, en partie volontaire, de la production des pétroles bruts. Naturellement, vu que ce contrôle s'applique surtout aux nouvelles régions de jaillissement, la construction des fabriques s'en est trouvée tant soit peu retardée.

Le programme adopté a prévu l'application de pratiques techniques perfectionnées aux fins d'exploiter plus systématiquement ces champs, et le désir commun à tous, ainsi que le but visé par le programme d'un bout à l'autre, a été d'assurer la conservation de nos ressources naturelles. Présentée en termes plus précis, cette pratique perfectionnée a tendu à conserver les pressions du gaz naturel et, par l'adoption de coefficients définis dans la production du pétrole et de l'essence, la quantité de gaz qui a été mise à la disposition des fabricants d'essence a été maintenue à un niveau très en-dessous de celui qu'il aurait pu autrement atteindre. Il est résulté de ce contrôle que la production d'essence naturelle est tombée du point culminant de 52.631.000 barils en 1930 à 33.810.000 barils pour l'année 1933. Alors qu'en 1930, la production d'essence naturelle avait représenté 12 pour cent du volume total de carburant pour moteurs produit aux Etats-Unis, la quantité fabriquée pour l'année 1933 ne représentait plus que 8 pour cent du total. A l'heure actuelle, l'essence naturelle constitue environ 9 pour cent de la production totale.

ATELIERS A PRESSION DE PUITS

Au cours de l'an dernier, un champ plus vaste s'est offert à l'installation d'ateliers spéciaux fournissant la pression aux puits, par suite de la plus grande profondeur à laquelle les exploitants de pétrole sont obligés de forer pour trouver les nappes pétrolières. Ces ateliers à pression de puits ont l'avantage d'éliminer le coût onéreux de l'achat de matériel compresseur, sans compter que, par l'emploi d'absorbeurs de grande efficacité et de matériel stabilisateur, on est à même de produire très économiquement l'essence naturelle. Sur les chantiers où se trouvent des nouvelles installations à pression de puits, on a souvent prévu dans le plan de l'atelier l'addition de serpentins réchauffeurs destinés à traiter le distillatum qui accompagne habituellement le gaz lorsqu'il est recueilli

Gasolina Natural

Durante estos ultimos cinco años, debido al cambio en condiciones económicas generales, la división de gasolina natural, de la industria del petróleo, ha tenido que modificar sus prácticas más que toda otra. Su dependencia de la división de producción de petróleo, para su abastecimiento de gas, necesitado para la conversión, ha hecho que sus actividades queden afectadas por regulaciones propias y fiscales, en lo tocante a producción de petróleo crudo. Como estas regulaciones se han aplicado principalmente a los campos bajo explotación activa, la construcciones de plantas nuevas ha sufrido, por lo tanto, cierto retardo.

El programa ha exigido la aplicación de perfeccionadas prácticas técnicas, para efectuar un desarrollo más ordenado de estos campos, y el mutuo deseo de todos y el fin fundamental del programa en toda su extensión, han sido conservar nuestros recursos naturales. Expresado en términos más claros, la práctica perfeccionada requiere la conservación de las presiones del gas natural. Mediante la mantención de una relación definida entre la producción de petróleo y de gas, la cantidad de gas, que ha quedado a la disposición de los fabricantes de gasolina, ha sido considerablemente menor que la de años anteriores. El efecto de esta regulación produjo un decaimiento en producción de gasolina natural, de un máximo de 52.631.000 de barriles en 1930, a 33.810.000 de barriles en 1933. En aquel año, la gasolina natural representaba 12% de la cantidad total de combustible de motor producida en los Estados Unidos. El rendimiento en 1933 representó sólo el 8% del total. Al presenta, representa como el 9% de la producción total nacional.

PLANTAS DE POZOS DE PRESION

Durante el año pasado se ha presentada un campo más vasta a la instalación de plantas de pozos de presión, a causa de las mayores profundidades a que los explotadores pueden hallar petróleo. Estas plantas de pozos de presión evitan el costo del equipo de compresores, al principio, y mediante el empleo de absorbedores y equipo de estabilización de gran rendimiento, pueden producir gasolina natural a un costo muy económico. En los campos donde están establecidas estas nuevas plantas de pozos de presión, se añaden, con frecuencia, adicionales alambiques de calentamiento al equipo, para refinar el destilado que generalmente sale con el gas en su primer tratamiento. Donde existe este destilado, resulta sumamente económica la manufactura de gasolina natural.

IDEAL-AJAX TWIN CYLINDER

Ideal-Ajax Twin Cylinder Steam Drilling Engines are being used in every Oil Field in the World. No drilling has yet been encountered that has been too tough for Ideal-Ajax Engines. The harder the drilling—the deeper the well—the more convincingly is Ideal-Ajax reliability demonstrated.

A Size and Type for Every Field

Sizes Bore & Stroke Inches	Type	BOXED FOR EXPORT Gross Weight	Volume Cubic Ft.
10 x 10	Open, Plain Crankshaft Bearings, Slide Valves	6,700	160
10 x 10	Semi-Enclosed, Plain Crankshaft Bearings, Slide Valves	7,800	182
11 x 11	Semi-Enclosed, Plain Crankshaft Bearings, Slide Valves	10,600	240
12 x 12	Semi-Enclosed, Plain Crankshaft Bearings, Slide Valves	10,800	240
12 x 12	Enclosed, Roller Bearing Crankshaft, Slide Valves	16,500	312
12 x 12	Enclosed, Roller Bearing Crankshaft, Piston Valves	16,300	312
14 x 14	Enclosed, Roller Bearing Crankshaft, Piston Valves	27,500	500
14 x 14	Enclosed, Roller Bearing Crankshaft and Crank Pins, Piston Valves	27,700	500

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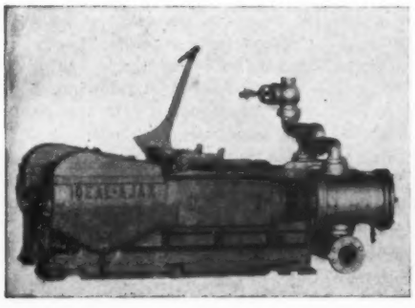
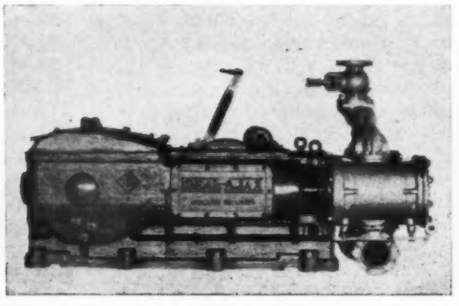
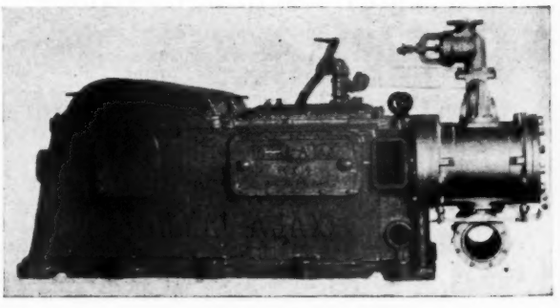
IN EVERY OIL FIELD



10″ x 10″ Twin Cylinder

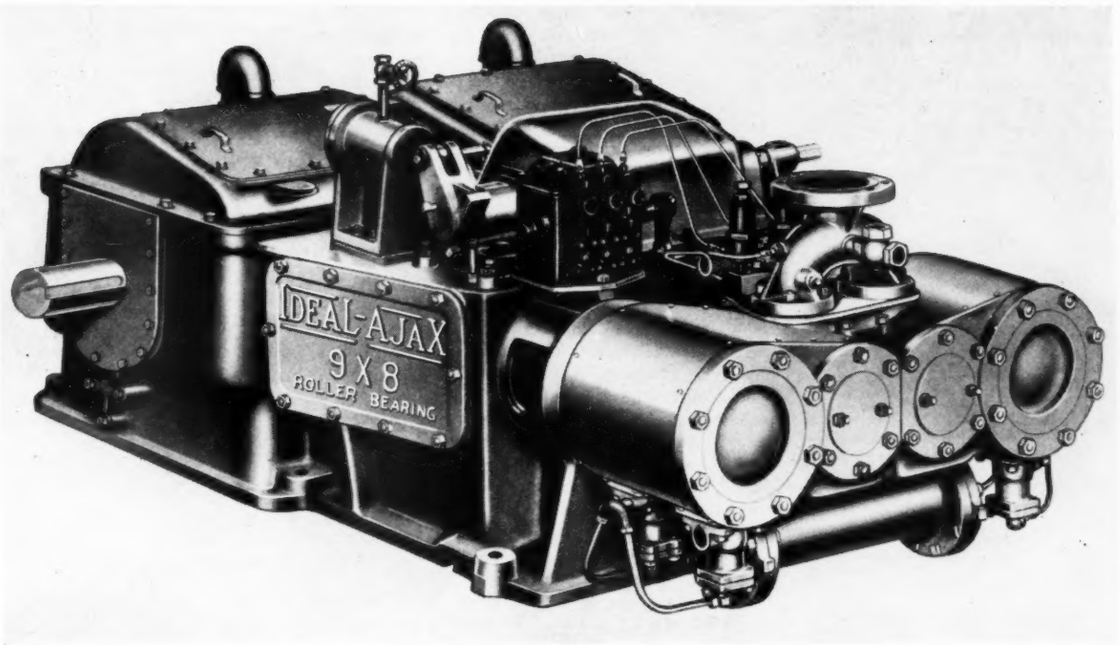


12″ x 12″ Twin Cylinder



14″ x 14″ Twin Cylinder

ER STEAM DRILLING ENGINES



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Less Wear on Large Hoisting Engine and Draw Works
Saving in Steam and Lubricating Costs
Quieter Running when Drilling
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Easier Spudding
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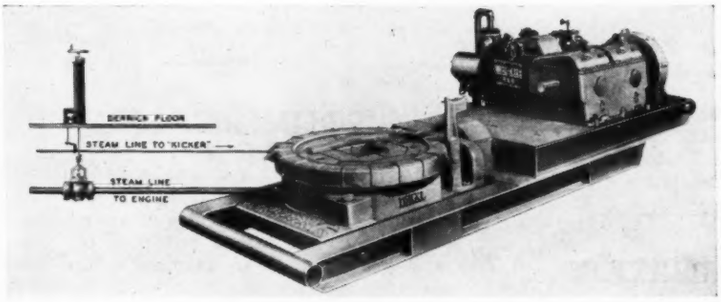
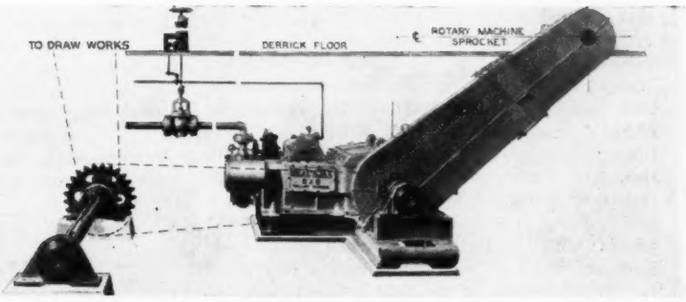
IN EVERY OIL FIELD



Direct Rotary Drive—Type "A"



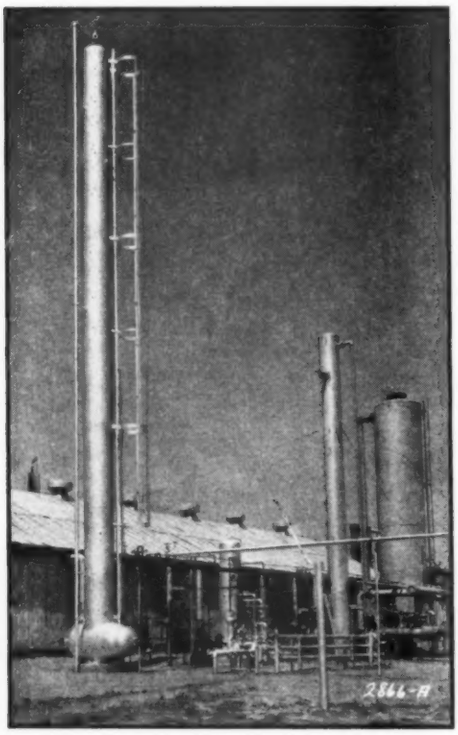
Direct Rotary Drive—Type "B"

also being used in many refineries for recovering gasoline from cracking still vapors. Less utilities are claimed as needed for a similar degree of recovery compared with the ordinary absorption plant.

TANKAGE

In plants operating on the conventional oil absorption process there has been some tendency to do away with lean oil storage facilities. Several plants have adopted the method of pumping the lean oil back into the absorbers, after it has passed through heat exchangers and without running it to storage tanks. Thus the amount of storage is reduced to this extent.

Another recent development in the manufacturing of natural gasoline has been the lowering of oil rates by saturating the lean oil with residue gases before the incoming oil reaches the primary absorber. The heat of absorption is removed from the lean oil before it enters the main tower. Thus it is



New stabilizer

possible to reduce the oil rate due to the temperature rise taking place in the absorber being lessened. A higher extraction efficiency in the absorber is also derived from this practice.

LIQUEFIED GASES

Although the bulk of the products of the natural gasoline plants at present goes into the blending of motor fuels, an important industrial market has developed for liquefied gases. The increasing demand for propanes and butanes has resulted in many plants installing equipment for the recovery of these products which were formerly vented to the air or burned as fuel in the residue gas. Since these hydrocarbons are present in the raw charge, they may be easily removed as separate components by the installation of additional rectifying towers. With the rectifiers equipped for pressure operation and aided by intercoolers, a very satisfactory separation of the light hydrocarbons can be effected.

In the East Texas field, as an example, where

à la première opération. Lorsque ce distillatum est présent, le prix de revient de la fabrication de l'essence naturelle se trouve nettement réduit.

TYPES D'INSTALLATION

En ce qui concerne le plan adopté pour les ateliers individuels, une enquête a révélé parmi les nouvelles constructions un nombre croissant d'ateliers de rectification des vapeurs en cours d'exécution. Selon ce procédé, on fractionne le gaz naturel sans passer par la phase d'absorption intermédiaire. On a aussi recours à ce procédé dans de nombreuses raffineries pour récupérer l'essence provenant du cracking des vapeurs d'alambic. On assure que, par ce procédé, on n'a pas lieu de pratiquer au même degré la récupération des produits utilisables que lorsqu'on emploie le type d'installation courant dit à absorption.

Dans les installations qui appliquent le procédé classique d'absorption pour le traitement des pétroles, on observe une certaine tendance à supprimer les réservoirs de magasinage des huiles pauvres. Plusieurs fabriques ont adopté la méthode consistant à pomper les huiles pauvres de retour dans les absorbeurs, après leur passage à travers des échangeurs de chaleur et sans intervention de réservoirs de magasinage. De cette manière, on réduit d'autant le nombre de réservoirs servant au magasinage.

Un autre progrès récent, qui est survenu dans la fabrication de l'essence naturelle, a été l'abaissement des coefficients d'huile en saturant les huiles pauvres de gaz résiduaires avant que les pétroles entrants soient parvenus à l'absorbeur primaire. On disperse la chaleur d'absorption avant que les huiles pauvres aient pénétré dans la colonne principale. De cette façon, on réussit à réduire le coefficient d'huile par suite de la moindre élévation de température notée dans l'absorbeur. Un autre avantage qui découle de cette pratique est celui d'un rendement d'extraction plus élevé dans l'absorbeur.

GAZ LIQUEFIES

Bien que la plus grosse part des produits préparés par les fabriques d'essence naturelle soit, à l'heure actuelle, employée dans le mélange ou dosage des carburants pour moteurs, un important débouché industriel a été développé pour les gaz liquéfiés. La demande croissante en propanes et en butanes a amené de nombreuses fabriques à faire l'installation de matériel destiné à récupérer ces produits qui, jusqu'ici, étaient soit dispersés dans l'air, soit brûlés comme combustible avec les gaz résiduaires. Etant donné que ces hydrocarbures sont présents dans la charge brute, on peut facilement en faire l'extraction comme composés séparés par l'installation de colonnes de rectification supplémentaires. A condition d'équiper les rectificateurs pour fonctionnement sous pression et avec le concours de refroidisseurs intermédiaires, une séparation très satisfaisante des hydrocarbures légers peut être réalisée.

Dans le champ du Texas Oriental, par example, où le gaz qui se dégage est particulièrement riche en propanes et en butanes, on peut dire qu'à peu près toutes les anciennes installations ont été remaniées afin de comprendre dans leur cycle d'opérations un matériel permettant de préparer les gaz liquides. Un débouché est offert à ces fractions par une compagnie de raffinage qui emploie ce matériel comme stock de chargement dans un nouveau groupe de polimérisation.

POLIMERISATION

La polimérisation se charge aussi de créer une demande plus forte en butanes et en propanes.

TIPO DE PLANTA

En relación con el tipo de las plantas individuales, un estudio de las nuevas instalaciones muestra un creciente número de plantas de rectificación por vapor. Este procedimiento fracciona el gas natural, sin necesidad de la etapa de absorción intermediaria. Se está empleando también en muchas refinerías para recobrar la gasolina de los vapores de alambique del procedimiento "cracking". Se dice que este nuevo procedimiento resulta menos costoso en comparación con el método de planta de absorción ordinaria.

ALMACENAJE

En las plantas que siguen el procedimiento corriente de absorción de petróleo, se ha visto la tendencia hacia desprenderse de las facilidades de almacenaje del petróleo delgado. Algunas plantas han adoptado el método de introducir de nuevo este petróleo, en los absorbedores, después de pasado por los cambiadores de calor, sin necesidad de meterlo en tanques de almacenaje. De este modo, la cantidad de almacenaje queda reducida en esta proporción.

Otro reciente desarrollo en la manufactura de gasolina natural ha sido la reducción en proporciones, saturando el petróleo delgado con gases de resíduo, antes de que el petróleo de entrada llegue al absorbedor primario. El calor de absorción se quita del petróleo de; gado antes de que entre a la torre principal. De esta manera, se hace posible reducir la proporción de petróleo, a causa de que se modera el alza de temperatura en el absorbedor. De esta práctica se deriva un mayor rendimiento de extracción en el absorbedor.

GASES LIQUIDOS

A pasar de que la mayor parte de los productos de las plantas de gasolina natural se aprovecha actualmente en la mezcla de combustibles de motor, se ha desarrollado un importante mercado para los gases líquidos. La creciente demanda de propanos y butanos ha resultado en que muchas plantas han instalado equipo especial para la recuperación de estos productos, que antes se escapaban al aire o se quemaban como combustible en el gas de residuo. Como estos hidrocarburos se hallan presentes en la carga primitiva, pueden separarse fácilmente, como componentes separados, mediante la instalación de adicionales torres de rectificación. Con rectificadores equipados para funcionamiento a presión y ayudados por enfriadores intermediarios, puede efectuarse una separación muy satisfactoria de los hidrocarburos livianos.

En los yacimientos del este de Texas, por ejemplo, donde el gas es particularmente rico en propanos y butanos, casi todas las plantas antiguas se han modernizado, comprendiendo equipo para la manufactura de gases líquidos. Estas fracciones tienen mercado entre las refinerías que aprovechan este material como abastecimiento de carga en las nuevas instalaciones de polimerisación.

POLIMERISACION

La polimerisación está estableciendo también una mayor demanda de butanos y propanos. Varias refinerías han instalado equipo para recuperar el butano de su gasolina de extracción por vapor, para la manufactura de gasolinas de tipo "polimer." Un nuevo aprovechamiento del butano se ha descubierto dentro de la misma planta de gasolina natural, es decir, el empleo del butano como

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El modelo corriente permite sacar una muestra de 42 pulgadas de largo. Hay, sin embargo, otros modelos que pueden sacar muestras hasta de 8 pies de largo. La construcción es sencilla, con un número minimo de piezas. Puede manejarse por cualquier operario perforador. Cabezas de barrena provistas de piezas insertadas de carburo de tungsteno y revestidas de carburo de tungsteno triturado, con elección a barrenas de dos o tres hojas.

Compre en seguida un sacador de muestras Brewster de cable y asegúrese de la herramienta sacadora de muestras más económical del mercado. Si Ud. se sirve indicarnos sus requisitos, nos será muy grato cotizarle precios.

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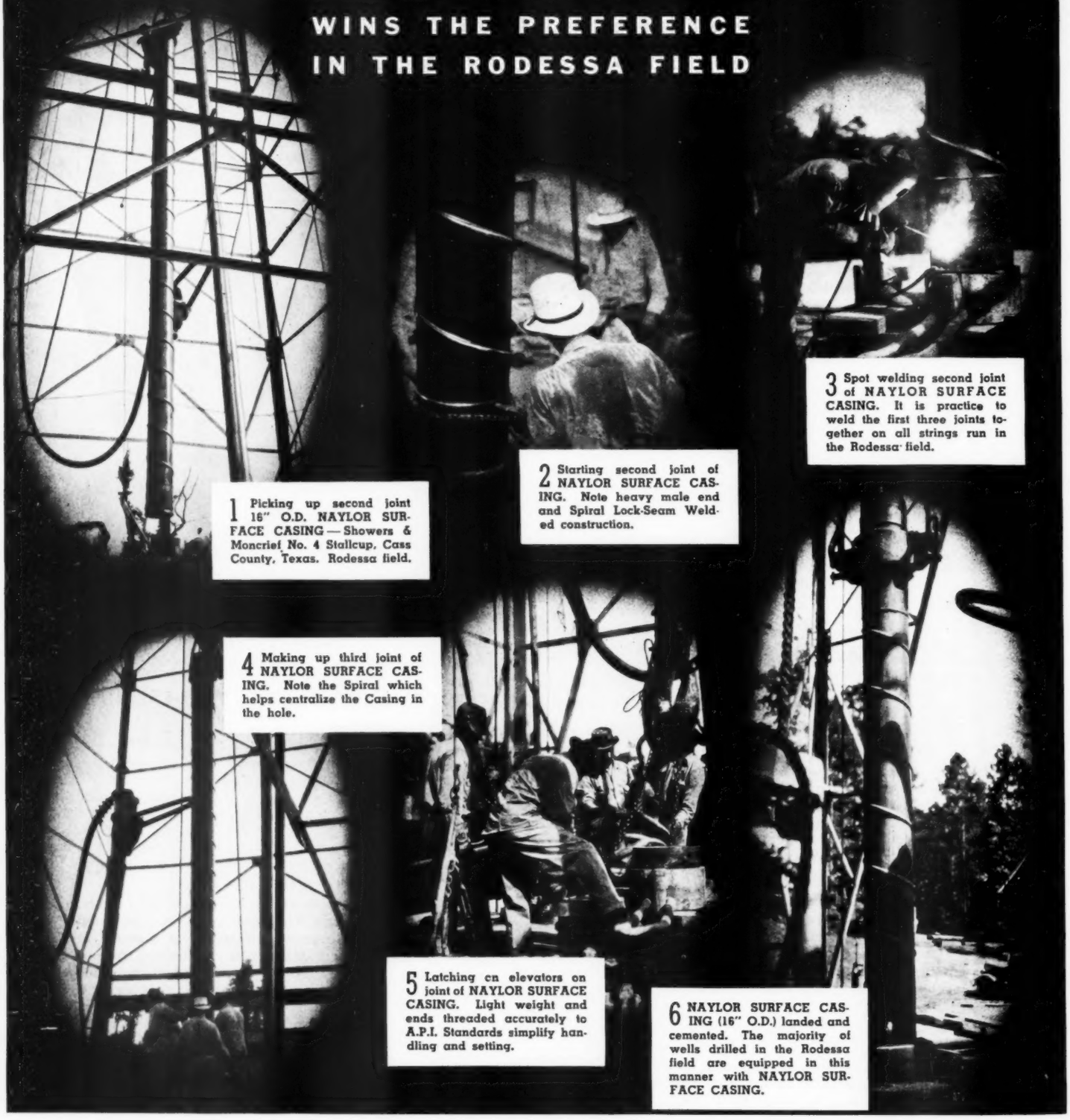
NAYLOR SURFACE CASING

WINS THE PREFERENCE IN THE RODESSA FIELD



1 Picking up second joint 16" O.D. NAYLOR SURFACE CASING — Showers & Moncrief No. 4 Stallcup, Cass County, Texas. Rodessa field.

2 Starting second joint of NAYLOR SURFACE CASING. Note heavy male end and Spiral Lock-Seam Welded construction.

3 Spot welding second joint of NAYLOR SURFACE CASING. It is practice to weld the first three joints together on all strings run in the Rodessa field.

4 Making up third joint of NAYLOR SURFACE CASING. Note the Spiral which helps centralize the Casing in the hole.

5 Latching on elevators on joint of NAYLOR SURFACE CASING. Light weight and ends threaded accurately to A.P.I. Standards simplify handling and setting.

6 NAYLOR SURFACE CASING (16" O.D.) landed and cemented. The majority of wells drilled in the Rodessa field are equipped in this manner with NAYLOR SURFACE CASING.

Scenes like this are typical of the Rodessa field where the majority of wells are equipped with Naylor Spiral Lock-Seam Welded Surface Casing.

The reason for this decided preference is the distinctive Naylor structure itself. For example, the Spiral on the outside helps centralize the Casing in the hole. It provides a breathing space around the Casing, thus insuring a better cementing job.

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the gas is especially rich in propanes and butanes, practically all the older plants have been remodeled to include equipment for manufacturing liquid gases. An outlet for these fractions is provided by a refining company which will use this material as charging stock in a new polymerization unit.

POLYMERIZATION

Polymerization is also creating a larger demand for butanes and propane. Several refining companies have installed equipment to recover the butane from their vapor-recovery gasoline for manufacturing polymer gasolines. One new use for butane has been found within the natural gasoline plant itself; that is, the using of butane as cooling media. The butane is compressed and then run to heat exchangers where it is allowed to expand and cool the overhead vapor streams.

Closely associated with the construction of depropanizing and debutanizing equipment is the use of fractionating equipment for manufacturing pentanes, hexanes and other liquid hydrocarbons used as commercial solvents. The production of these materials is practically the same as for regular gasoline fractionation except for variations in operating pressures and temperatures, the number and spacing of trays, and differences in tower sizes and reflux ratios.

TOWERS

While the fractionation and absorption equipment has probably undergone the greatest advancement in efficiency of operation, compression equipment is also being steadily improved. The basic principle of operation and design of compression equipment has not shown much recent change, but the manufacturer has continued his efforts to improve and perfect the accepted equipment in general use. Many minor changes in design and materials have aided the e f f i c i e n c y of operation. Changes have been made in valves and cylinders. More compact and lighter engines, requiring less space and being more easily installed and repaired, are now available to the industry. Engine vibration has been reduced to a minimum and the over-all efficiency of the engine increased.

STORAGE

Because of the increased vapor pressure of the products handled, the natural gasoline industry has changed the design of storage and working tanks to reduce vaporization losses. In the past the practice was to locate tanks underground or under sheds and through these means protect the tanks from atmospheric temperatures. No vapor recovery system was in use, thus vapors were unavoidably vented into the air. To minimize these losses, heat reflective coatings are in general use, tanks are equipped with water sprays for cooling the shell temperature, and tanks are fabricated to reduce the internal pressure on the shell. Also, the installation of vapor recovery systems or vapor balloons has practically eliminated the venting of gasoline vapors into the air.

The industry has also made great progress in the prevention of accidents and the reduction of fire hazards. All buildings are well ventilated or, if built in warmer climates, no sides are added as part of the building. Drains are kept free from inflammable liquids and water seals are provided for the protection of other users of the same drainage system.

Plusieurs de compagnies de raffinage ont fait l'installation de matériel leur permettant de recueillir le butane à partir de leur essence récupérée de vapeurs, et cela en vue de préparer les essences dites polimères. Une nouvelle application du butane a été d'couverte à l'intérieur même de la fabrique d'essence naturelle, à savoir l'utilisation du butane comme agent refroidisseur. On comprime le butane, puis on le fait passer dans des échangeurs de température où il a l'occasion de se détendre et de refroidir les effluves de vapeurs qui passent au-dessus.

Se rattachant étroitement à la construction de matériel extracteur de propanes et de butanes, est l'emploi de matériel de distillation fractionnée pour la fabrication des pentanes, des hexanes et d'autres hydrocarbures liquides qui trouvent à être employés comme solvants dans le commerce. La production de ces produits est à peu près la même que la distillation fractionnée habituelle pour l'essence, à l'exception d'écarts dans les pressions et les températures d'opération, de variations dans le nombre et l'espacement des plateaux, et de différences dans les dimensions des colonnes et les coefficients de reflux.

COLONNES

Bien que le matériel de distillation fractionnée et d'absorption ait probablement marqué le progrès le plus sensible en rendement, le matériel de compression lui aussi a été de plus en plus perfectionné. On n'a pas sensiblement changé le principe de base de l'opération, ni de la construction du matériel de compression, mais le fabricant n'en a pas moins continué à appliquer ses efforts en vue d'améliorer et de perfectionner le matériel officiellement adopté dans la branche et d'un emploi généralisé. Par suite, de multiples changements de détail apportés à la construction et au matériel ont contribué à augmenter les rendements d'opération. Des modifications ont été adoptées pour les soupapes et les cylindres. En outre, les industriels de la branche peuvent maintenant se procurer des moteurs à la fois plus compacts et plus légers, prenant moins de place et plus faciles à installer ou à réparer. Enfin, la trépidation du moteur a été réduite au strict minimum et le rendement économique moyen du moteur a été amélioré.

MAGASINAGE

A cause des pressions de vapeurs en croissance des produits mainés, l'industrie de l'essence naturelle a été amenée à modifier le tracé des réservoirs de magasinage et de ceux en service aux fins de réduire les pertes par vaporisation. Dans le passé, la pratique habituelle consistait à placer les réservoirs dans le sol ou sous des remises, et, de cette manière, on mettait les réservoirs à l'abri des températures atmosphériques. Il n'y avait pas alors de système de récupération de vapeurs en usage, de sorte qu'on ne pouvait pas récupérer ces vapeurs qui étaient dissipées dans l'air. Dans le but de réduire ces pertes au minimum, l'application d'enduits réfléchissant la chaleur est maintenant générale, on munit les réservoirs de pulvérisateurs d'eau destinés à refroidir la température des parois, et ces réservoirs eux-mêmes sont fabriqués de manière à réduire la pression interne s'exerçant sur les parois. Ajoutons, enfin, que l'installation de systèmes de récupération des vapeurs ou ballons à vapeurs a mis fin à la dispersion des vapeurs d'essence dans l'air.

L'industrie a aussi enregistré un progrès marqué dans le domaine de la prévention des accidents et la réduction des dangers d'incendie. Tous les bâtiments sont maintenant bien aérés et, lorsque ceux-ci se trouvent situés dans des climats chauds, on a supprimé les parois comme partie du bâtiment. Ajoutons que les trous de vidange sont maintenus exempts de liquides inflammables et qu'il est prévu des joints d'étanchéité à eau pour la sécurité des autres usagers du même système de vidange.

agente de enfriamiento. El butano se comprime y se pasa luego a los cambiadores de calor, donde se deja dilatarse, para que enfríe las corrientes de vapor superiores.

Intimamente en asociación con los equipos para la depropanisación y debutanisación se halla el empleo del equipo de fraccionamiento, para la manufactura de pentanos, hexanos, y otros hidrocarburos líquidos, utilizados como disolventes comerciales. La producción de estos materiales es casi igual al procedimiento de fraccionamiento corriente de la gasolina, salvo ciertas variaciones en presiones y temperaturas de trabajo, número y separación de bandejas y diferencias en tamaños de torres y relaciones de reflujos.

TORRES

A pesar de que el equipo de fraccionamiento y absorción ha sido probablemente objeto del mayor progreso en rendimiento operativo, el equipo de compresión ha recibido, por parte, constante atención en el sentido de perfeccionamiento. El principio fundamental de funcionamiento y proyecto mecánico del equipo de compresión no muestran especiales modificaciones recientes. El fabricante, sin embargo, ha refinado y perfeccionado el equipo corriente de uso general. Varios cambios en construcción y materiales han venido a aumentar el rendimiento efectivo de estos equipos. Se observan cambios interesantes en las válvulas y cilindros. Los motores son más livianos y pequeños, necesitando menos superficie de piso y prestándose a más fácil instalación y reparación. Se ha reducido a un mínimo la vibración del motor y, en general, el rendimiento de la instalación motriz se ha mejorado notablemente.

DEPOSITOS

Debido a la mayor presión de vapor de los productos manejados, la industria de la gasolina natural ha cambiado el tipo de tanques o depósitos de trabajo y almacenaje, para reducir las pérdidas por evaporación. En años pasado se seguía la práctica de colocar los tanques en lugares subterráneos o debajo de techos, para protegerlos contra la influencia de las temperaturas atmosféricas. No existía entonces ningún sistema de recuperación de vapor, el cual se perdía en la atmósfera irremediablemente. Para reducir estas pérdidas, se emplean ahora capas reflectivas de calor, los tanques están equipados con rociadores de agua, para enfriar al atmósfera de cercana a los tanques, y los mismos tanques se fabrican de modo que tengan una presión interna mínima sobre las paredes. Por otra parte, la instalación de sistemas de recuperación de vapor, o globos de vapor, ha casi suprimido el escape de los vapores de gasolina al aire.

La industria ha alcanzado también notables progresos en la prevención de accidentes y reducción del peligro de incendio. Todos los edificios están muy bien ventilados, y al hallarse en climas calurosos, no se les agrega lados, como partes integrantes. Los desagües o sistemas de drenaje se conservan exentos de líquidos inflamables y se emplean cierres de agua para la protección de otros que se valgan del mismo sistena de desagüe.

For Safety and Economy Specify

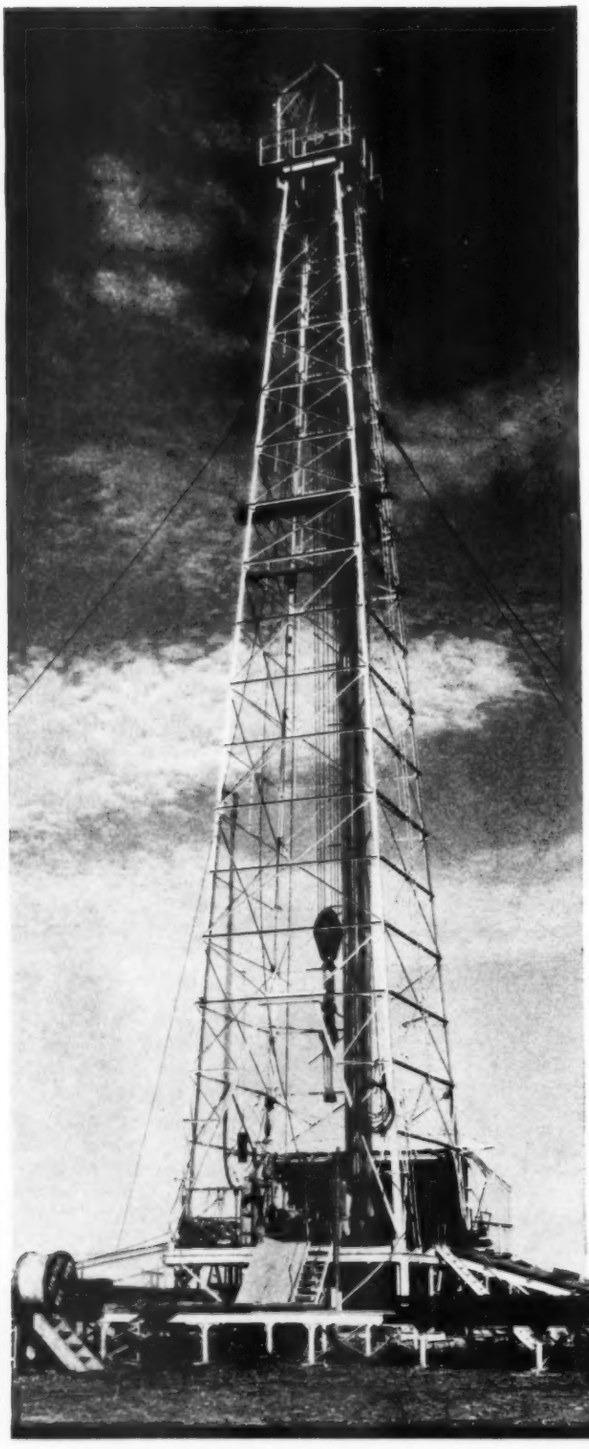

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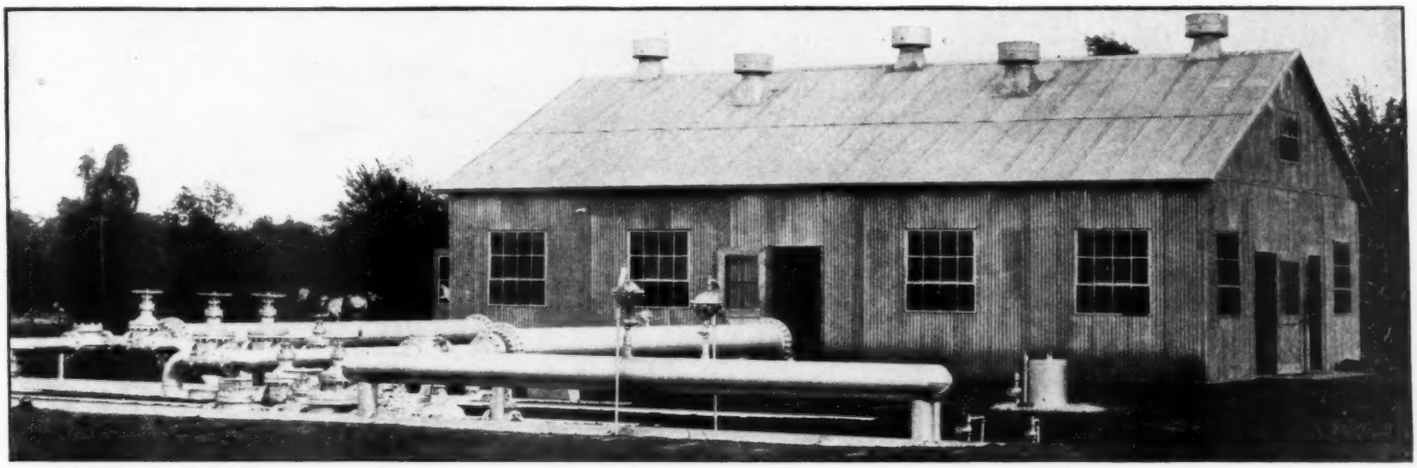
Photo shows All Steel Drilling assembly in Saxet Field, South Texas



Transportation

GENERAL STATEMENT

With demand for about 3,000,000 barrels of crude daily from the fields of the United States major pipe line systems have been called upon to maintain high efficiency in operation and avoid shut-downs. This has been made possible through the change in handling oil direct from field to consumer without intermediate or field storage tanks. For some time major pipe line systems have been eliminating field storage and work tanks following development of pumping units and pipe lines sufficiently reliable to permit full time efficient operation. Elimination of steel tankage has also been desirable because it has reduced capital investment and taxes.

The major pipe line pump stations are now powered with diesel engines, or electric motors in practically every instance and the pumps may be of the reciprocating or centrifugal type. Pressures maintained in the lines are higher than formerly because better grade pipe is available. Most of the lines are now welded their entire length. River crossings are in multiple and installed to give minimum of trouble during high water. Communication systems are adequate and dispatchers keep close track of oil in transit. These added facilities have permitted batching of oil successfully.

To maintain the lines in first class working condition, many 6-, 8- and 10-inch sections have been taken up and replaced with larger lines. This has been found profitable and has provided more efficient service arteries. Even with the many changes in pipe diameter several loops were laid during the summer and gathering facilities have been extended in many areas. Few wells, regardless of location, are now without pipe line connections.

During the past two or three years large sums have been spent on upkeep of pipe lines. Whole systems have been reconditioned and where active corrosion has been found measures have been taken to retard it. Many systems have welded old screw joints. Patches have been welded over weak spots and long sections covered with special coatings.

Electrolytic corrosion is now being retarded by cathodic protection methods. Stray and earth currents act upon pipe lines and to combat corrosion caused by such currents the cathodic unit is now utilized. This drains the current from the pipe by connecting a heavy copper cable to the positive side of a rectifier or motor-generator unit to a ground bed and another cable strung from the negative terminal to the line and connected to it. The ground bed consists of junk pipe or other metal presenting a large surface buried at a point 300 to 500 feet from the line. The earth between line and ground bed should be moist at

La transportation

EXPOSE GENERAL

Etant donnée l'extraction journalière d'environ 3,000,000 de barils de pétrole brut faites dans les champs pétroliers des Etats-Unis, on a dû installer de vastes réseaux de pipe-lines afin de maintenir une haute efficacité de l'exploitation et éviter les temps d'arrêt dans l'extraction. On est arrivé à ces résultats en modifiant le mode de transport du pétrole, à savoir en en faisant la manipulation directe du chantier au lieu de consommation sans avoir recours à des réservoirs intermédiaires d'emmagasinage au chantier ou sur le parcours. Il y a déjà quelque temps que les principaux réseaux de pipe-lines ont éliminé les réservoirs de service et d'emmagasinage au chantier, à la suite de la mise au point de groupes de pompage et de pipe-lines suffisamment résistants pour permettre une exploitation efficace soutenue. On a aussi trouvé intérêt à supprimer les réservoirs d'acier, car on a de cette manière réduit l'immobilisation des capitaux et les impôts.

Les stations de pompage des principales canalisations sont maintenant actionnées par des moteurs Diesel ou par des moteurs électriques dans la plupart des cas, et les pompes peuvent être soit du type alternatif ou du type centrifuge. Les pressions maintenues dans les conduites sont plus élevées que par le passé, par suite du fait qu'on emploie de la tuyauterie d'une qualité supérieure. La plupart des conduites sont maintenant soudées sur leur longueur entière. Les passages de cours d'eau sont du type dit multiple et installés de manière à donner le moins d'ennuis possible lorsque les eaux sont hautes. On dispose de systèmes de transmission amplement suffisants, et les préposés au transport suivent de près les mouvements des pétroles en cours de transport. Ces facilités étendues ont permis d'effectuer avec succès le transport rapide des pétroles.

Aux fins de maintenir les conduites en parfait état de marche, on a enlevé un bon nombre des sections de tuyauterie de 6, 8 et 10 pouces, et on les a remplacées par des canalisations d'un calibre plus fort. Cette substitution a eu d'heureux résultats et s'est traduite par des réseaux d'un service plus efficace. Bien qu'on ait déjà changé souvent les diamètres des conduites employées, on a cru nécessaire d'installer plusieurs ramifications ou "boucles" au cours de l'été, et les facilités de concentration des pétroles ont été améliorées dans de nombreux secteurs. On peut dire que bien peu de puits sont maintenant sans liaisons de pipe-lines, de quelque endroit qu'il s'agisse.

Au cours de ces deux ou trois dernières années, on a dépensé de fortes sommes d'argent dans l'entretien des pipe-lines. Des réseaux entiers ont été rénovés, et où on s'est trouvé en présence de corrosion active, on a aussitôt pris des mesures pour

Transportacion

INFORMACION GENERAL

Debido a la demanda diaria de como 3.000.000 de barriles de petróleo crudo de los yacimientos en los Estados Unidos, los principales sistemas de distribución o transmisión por tubería se han visto obligados a mantener un gran rendimiento en el trabajo y evitar paralizaciones. Esto se ha hecho posible por el cambio en el manejo del producto directamente al consumidor, sin la ayuda de tanques de almacenaje locales o intermediarios. Desde hace algún tiempo, los sistemas principales de transmisión por tubería han venido abandonando los tanques de almacenaje y de trabajo, a continuación del perfeccionamiento de bombas y tuberías competentes para facilitar un constante funcionamiento satisfactorio. La eliminación de los tanques de acero ha sido también conveniente, a causa de que ha reducido la inversión de capital y pago de impuestos.

Las principales estaciones de tuberías están ahora provistas de motores diésel, o de motores eléctricos, con bombas de movimiento alternativo o de tipo centrífugo. Las presiones que se mantienen en las tuberías son más grandes que las de antes, debido a la mejor calidad de los mismo tubos. Casi todas las tuberías están soldadas en toda su extensión. Los cruces de ríos se hacen en tubería múltiple y la instalación en estos puntos se dispone de modo que haya un mínimo de molestia en las creces. Los sitemas de comunicación son adecuados, con efectivos métodos de control para llevar cuenta exacta del producto en tránsito. Estas adicionales facilidades han permitido una satisfactoria transmisión en crecientes cantidades.

Para conservar los sistemas de tuberías en buenas condiciones de trabajo, muchas secciones de 6, 8 y 10 pulgadas han sido reemplazadas por tubos de mayor diámetro. Esto ha resultado lucrativo y provisto arterias de servicio más eficaz. A pesar de los muchos cambios en diámetro de tubería, se instalaron este verano pasado numerosos sistemas auxiliares o suplementarios, extendiéndose así las facilidades de recolección a muchos campos petrolíferos. En realidad, muy pocos pozos, sin relación a su locación, se hallan ahora desprovistos de conexión de tubería.

Durante estos últimos dos o tres años se han gastado enormes sumas de dinero en la conservación de los sistemas de tuberías. Se han rehabilitado sistemas completos, y donde se ha presentado corrosión activa, se han tomado todas las medidas necesarias para retardarla o evitarla. Muchos sistemas han soldado las antiguas juntas atornilladas o roscadas. Se han soldado parches sobre los puntos débiles y se ha aplicado revestimiento especial a largas secciones de tuberías.

La corrosión electrolítica se está ahora retardando por métodos de protección catódica. Las cor-

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all seasons and ground resistance is appreciably lowered if several hundred pounds of stock or ice cream salt is mixed with the earth surrounding the pit where the metal is buried.

When the generator is in operation the field spreads out in all directions from the ground bed. Current leaving the ground bed returns to it through the cable connected to the line. The line then becomes the cathode in the system and current flows to the line and not away from it and loss of metal or pitting of the pipe is materially reduced.

Pipe line design has been greatly standardized. Problems are studied by engineers who in most instances are able to recommend procedures previously tried. Transportation of gas, oil or gasoline is no longer subject to rule-of-thumb procedure with many unknowns but is an exact science developed through exchange of ideas and practices.

Gas transportation has been materially expanded during the year. Several large diameter trunk lines have been laid to eastern cities. Only modern equipment has been used but it has been found necessary to install many additional power stations at intermediate points along existing trunk lines to increase the volume of gas delivered to industrial centers.

Mapping of pipe line right of ways by aerial photography is now well established. This method has reduced time and cost and in many instances is more satisfactory than ground surveys. It has found special application in determining stream crossings and approaches.

Most pipe line systems have established departments to handle and recondition reclaimed material. Pipe, valves and fittings form the major portion of the reconditioned material but as experience has been gained the field of articles worked over has been expanded until it includes magnetos, gauges, regulators, recorders and similar apparatus.

IMPROVEMENTS IN PUMPING PRACTICES

In keeping with the general improvements in pipe line design including perfection of welding practice, adaption of the diesel engine and centrifugal pumps finding general use on major trunk lines, there have been many improvements in the handling of equipment and increasing of efficiency. Waste heat boilers are now generally used to utilize exhaust heat from the diesel engines, air filters are installed in all modern pumping stations, lubricating and fuel oil is cleaned, thermometers are used to determine exhaust temperatures, and engine cooling water systems have been developed to high efficiency.

Waste heat from diesel engines is utilized in heaters which heat water and muffle the exhaust. These heaters are capable of delivering steam at 5-pound pressure for heating buildings. Hot water is available for washing purposes. Waste heat boilers cost about $1 per b.h.p. to install and the upkeep is low.

Centrifugal lubricating oil cleaners are now generally used in diesel engine plants. Using this equipment removes dirt and foreign material from the lubricating oil, reducing wear of moving parts in the engine.

From repeated experiments it has been determined that for a given load on the engine there is a definite exhaust temperature. To keep record of exhaust temperatures it is common practice to install thermometers in the engine exhaust line.

Closed cooling water systems are now generally used with diesel engines. Such systems have many advantages but the principal one is maintenance of fresh water free of solids thus preventing formation of scale on cylinder walls. Evaporation losses in the properly designed closed cooling water systems are from 3 to 10 per cent of the volume handled.

Use of these improvements is doing much to

l'enrayer. Dans de multiples reseaux, on a soudé d'anciens joints vissés. Des emplâtres ont été soudés sur les points faibles et des sections prolongées ont été recouvertes d'enduits spéciaux.

On arrive maintenant à ralentir la corrosion électrolytique par le moyen des méthodes dites de protection cathodique. Les courants de dispersion et de terre ont une action sur les pipe-lines, et afin de combattre la corrosion causée par ces types de courants, on a maintenant recours au groupe cathodique. Ce dernier soutire le courant du tuyau en reliant un câble en cuivre massif au côté positif d'un rectifieur ou groupe moteur-générateur à un couchis de terrain, et un autre câble fixé entre la borne négative et al conduite, et relié à cette dernière. Le couchis de terrain consiste de tuyau de rebut ou de tout autre métal présentant une grande surface, et enfoui à une distance de 300 à 500 pieds de la conduite. La terre employée entre la conduite et le couchis de terrain doit être humide en toute saison, et al résistance du terrain est sensiblement réduite si on mélange plusieurs centaines de livres de sel de stock ou de crèmes glacées avec la terre qui entoure la fosse où le métal est enfoui.

Lorsque le générateur est en opération, le champ d'action s'étend dans tous les sens à partir du couchis de terrain. Le courant qui part du couchis de terrain y revient par l'entremise du câble relié à la conduite. La conduite devient alors la cathode dans le système en question, de sorte que le courant se rend à la conduite et ne s'en éloigne pas, d'où le résultat appréciable que les pertes de métal ou les piqûres du tuyau sont sensiblement réduites.

La construction des pipe-lines a été standardisée dans une grande mesure. Les questions se rattachant au sujet sont étudiées par des ingénieurs qui, dans la plupart des cas, sont à même de recommander des méthodes qui ont fait leurs preuves. Le transport du gaz naturel, des pétroles et des essences ne relève plus de l'empirisme avec toutes ses inconnues, mais est devenu une science exacte qui a pris naissance par échange d'idées et de pratiques.

Le transport du gaz naturel a pris une très grande extension au cours de l'année. Plusieurs conduites principales d'un fort diamètre ont été posées dans les villes de l'Est. On n'a fait emploi que de matériel moderne, mais il a fallu installer de nombreuses stations ou centrales additionnelles à des points intermédiaires sur le parcours des canalisations principales en existence afin d'augmenter le volume de gaz naturel amené dans les centres industriels.

L'établissement de cartes des droits de passage pour pipe-lines par le moyen de la photographie aérienne est maintenant d'un usage très répandu. Grâce à l'emploi de cette méthode, on a réalisé des économies de temps et d'argent, sans compter que dans de nombreux cas, cette méthode a donné des résultats meilleurs que les prospections à terre. Ce procédé a aussi trouvé une application spéciale dans la détermination des passages de cours d'eau et de leurs voies d'accès.

La plupart des réseaux de pipe-lines ont établi des services spéciaux pour la manipulation et la rénovation du matériel récupéré. La tuyauterie, les soupapes ou vannes et les garnitures constituent la majeure partie du matériel ainsi rénové, mais à mesure qu'on a acquis davantage d'expérience dans cette partie, la gamme d'articles ainsi rénovés s'est étendue, de sorte que, à l'heure actuelle, elle comprend des magnétos, des jauges, des régulateurs, des appareils enregistreurs et instruments similaires.

PERFECTIONNEMENTS DANS LES METHODES DE POMPAGE

Parallèlement aux améliorations générales qui ont été adoptées dans la construction des canalisa-

rientes de dispersion y terrenales actúan sobre las tuberías, y para combatir la corrosión provocada por semejantes corrientes, se emplea ahora el principio catódico. Este método quita la corriente de la tubería. Se conecta un grueso cable de cobre, que sale del positivo de un rectificador o motogenerador, a un lecho en la tierra, y otro cable, que sale del borne negativo, a la tubería donde se conecta. El lecho en la tierra consiste en tubos u otros objetos viejos de metal, que presenten una buena superficie, enterrados en un punto a una distancia de 300 a 500 pies de la tubería. El terreno entre la tubería y el lecho en la tierra debe estar húmedo durante todo el año, y se reduce considerablemente la resistencia si se mezclan algunos centenares de libras de sal de roca con la tierra que hay encima y alrededor del hoyo en que está enterrado el metal.

Cuando el generador está funcionando, el campo se extiende en todas las direcciones desde el lecho en la tierra. La corriente que sale del lecho regresa a este punto por el cable conectado a la tubería. La tubería se convierte así en el catodo del circuito, pasando entonces la corriente por la tubería, en lugar de alejada de ella. De esta manera se reduce sensiblemente la corrosión de la tubería.

La construcción de sistemas de tubería ha sido notablemente normalizada. Los problemas son estudiados por ingenieros, quienes, en la mayor parte de los casos, pueden recomendar procedimientos que han dado buenos resultados en similares casos anteriores. La transmisión de gas, de aceite y de gasolina, por tubería, no es más un procedimiento especulativo, con elementos desconocidos, sino una ciencia exacta, perfeccionada por un continuo intercambio de ideas y prácticas.

El transporte de gas ha crecido considerablemente durante el presente año. Se han instalado varias tuberías de gran diámetro para el transporte a ciudades en el este. Se ha empleado sólo el equipo más moderno, pero se ha presentado también la necesidad de instalar adicionales centrales de fuerza, en puntos intermediarios, a lo largo de los presentes sistemas de tuberías, para aumentar la cantidad de gas entregada a centros industriales.

El hacer planes topográficos, para determinar el curso de tuberías en proyecto, se facilita ahora mucho con la ayuda de la fotografía aérea. Este método ha reducido el tiempo y el gasto, y en muchos casos resulta más satisfactorio que el trabajo con pié en tierra. Resulta particularmente útil en descubrir cruces y accesos de vías fluviales.

Casi todos los sistemas de tubería han establecido departamentos para la rehabilación o recondicionamiento de materiales viejos o usados. Tubos, válvulas y acoplamientos y accesorios de tuberías, representan la porción principal del material rehabilitado. Con la experiencia ya adquirida en este trabajo, la rehabilitación ha llegado a comprender magnetos, contadores, reguladores, regisradores y otros aparatos similares.

PROGRESOS EN METODOS DE BOMBEAR

En armonía con los adelantos generales en proyecto y construcción de oleoductos, entre los cuales figuran el perfeccionamiento de la soldadura, el empleo del motor diésel y la creciente utilización de las bombas centrífugas en importantes sistemas de transmisión, se presentan ahora muchos progresos en el mismo manejo del equipo, que conducen a mayor rendimiento. Se ha difundido el uso de calderas de vapor gastado, para utilizar el calor de escape de los motores diésel; se instalan depuradores de aire en todas las modernas plantas de bombear; se depuran o limpian los aceites lubricantes y combustibles; se emplean termómetros para determinar las temperaturas del escape, y se ha aumentado el rendimiento de los sistemas de enfriamiento por agua de los motores.

El calor gastado de los motores diésel se utiliza

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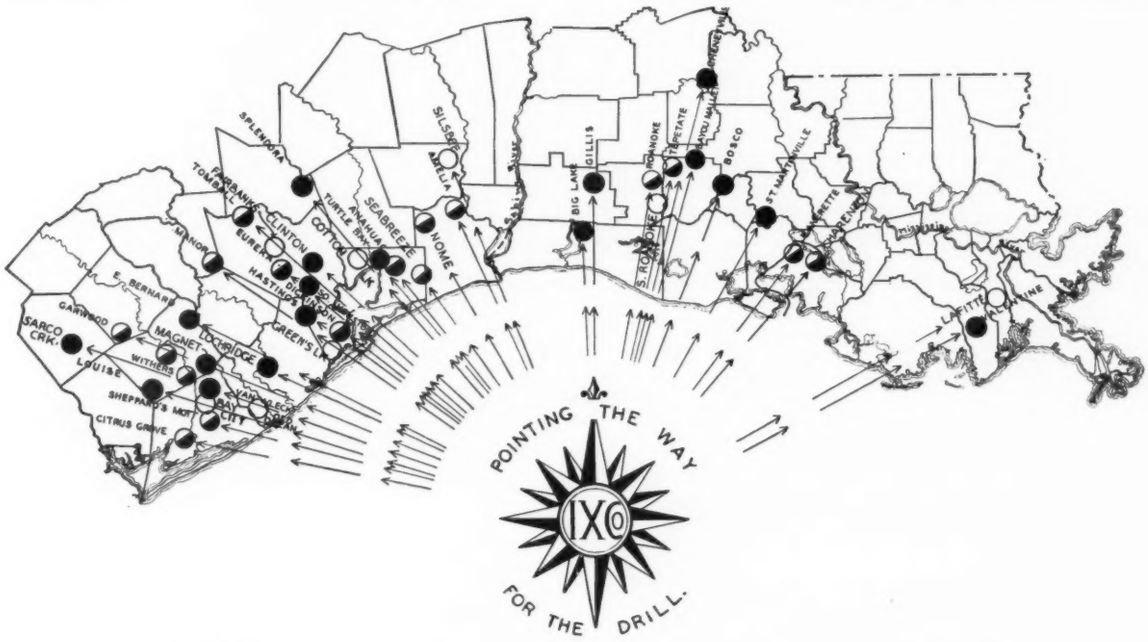

LEGEND:

Black circles—field discovered on original reflection survey by Independent Exploration Company	18
Half-black circles—proved fields checked and recommended by Independent Exploration Company (prior to development) for drilling	17
	35
TOTAL number of fields	43

LEGENDE:

Cercles noirs—champs découverts par prospection à réflexion originale, par l'Independent Exploration Company	18
Cercles mi-noirs—champs prouvés, signalés et recommandés par l'Independent Exporation Company (avant exploitation) pour le forage	17
	35
TOTAL de champs	43

LEYENDA:

Circulos negros—campos descubiertos por estudio de reflexión original por la Independent Exploration Company	18
Circulos seminegros—campos comprobados, señalados y recomendados por la Independent Exploration Company (con anterioridad a la explotación) para su perforación	17
	35
TOTAL de campos	43

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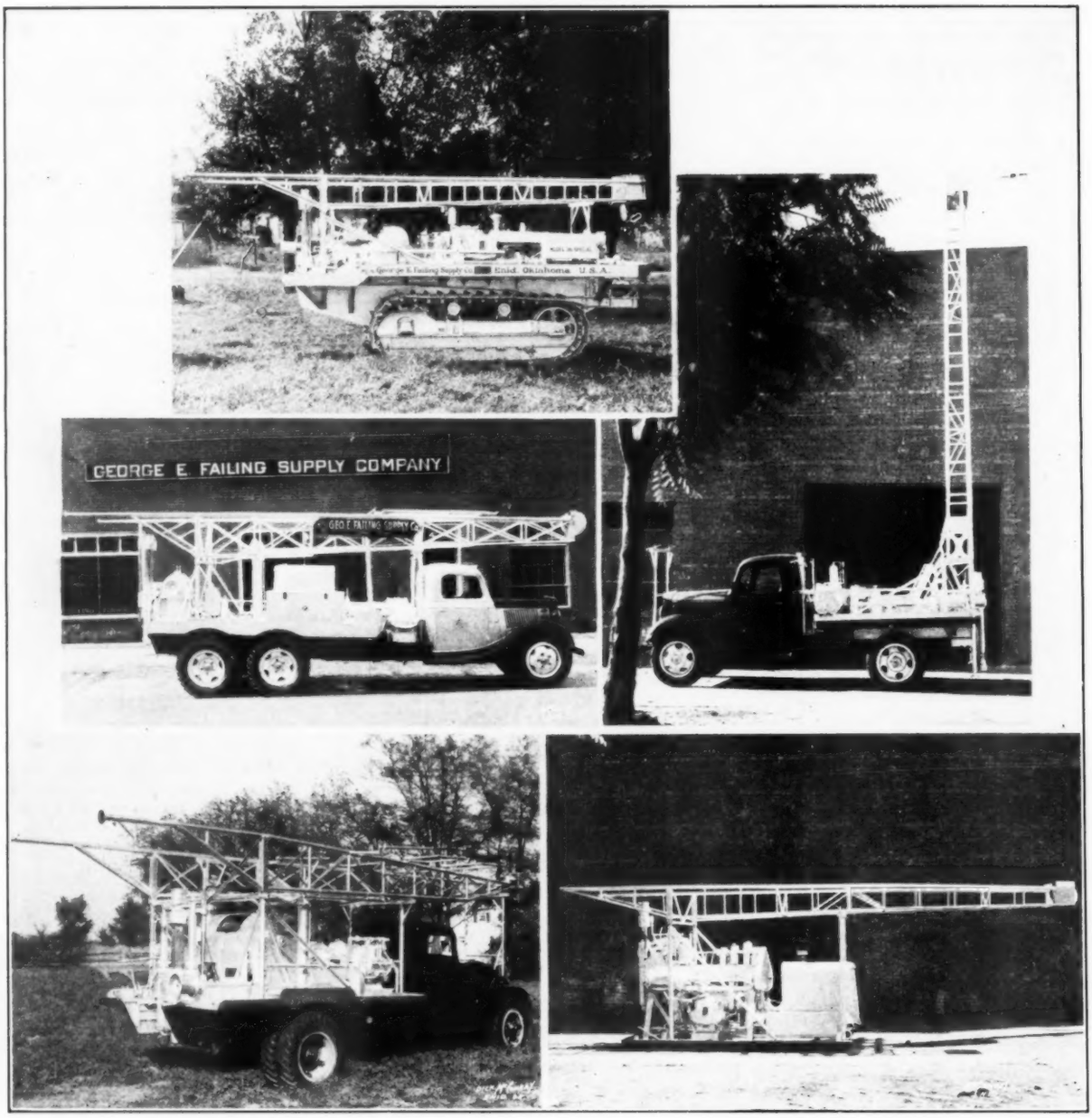

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lower operating costs and reduce shut-down time and costs of repairs. Increase in horsepower output per pound of fuel oil used is another advantage. These improvements can be applied to old as well as to new stations.

RECONDITIONING

Necessity of handling large volumes of oil daily has made it economical to recondition pipe lines and instead of making repairs at places where the lines actually leak or where corrosion has been noticeable the new practice is to uncover, raise, clean, inspect, weld, patch, half-sole, sleeve, wrap, and coat the whole line. Such reconditioning jobs have been done on many major pipe lines in re-

Crossing Wyoming bridge

cent years. This expenditure is justified because after this work has been properly completed the life of the lines is materially increased and loss of oil and shutdowns reduced to a minimum.

All operations are carried on while the lines are in operation. The ditch is opened, using machine and hand shoveling. The pipe is hoisted out and cleaned by machine and hand. The pipe is carefully inspected and pits, leaky couplings and weak pipe located. Before general welding is started pits are repaired by clamping on patches and gaskets and welding the patches to the pipe. Bad couplings are welded at both ends or covered with standard split sleeves welded to the pipe. Weak joints are repaired with half-soles or full split sleeves.

RECLAIMING MATERIAL

Small pipe has been removed from pipe line systems and larger pipe substituted to increase efficiency. The pipe removed has been reconditioned and used in other lines. Many pipe line systems maintain shops for reclamation of other equipment.

Fittings, valves, regulators, recorders, magnetos, electrical instruments, and other large and small items are now regularly reconditioned. This work has been highly specialized and has resulted in salvaging of material worth many hundreds of thousands.

tions ou pipe-lines, entre autres le perfectionnement du procédé de soudure, l'adoption du moteur Diesel et des pompes centrifuges sur une échelle croissante sur le parcours des canalisations principales, on a apporté de nombreux perfectionnements dans le maniement du matériel et les rendements ont été fortement accrus. Les chaudières à chaleur résiduaire sont maintenant d'un emploi général pour tirer parti de la chaleur d'échappement qui se dégage des moteurs Diesel, des filtres à air sont installés dans toutes les stations modernes de pompage, l'huile combustible et de graissage est épurée, des thermomètres sont employés pour déterminer les températures d'échappement, et des systèmes à eau de refroidissement des moteurs ont été mis au point pour assurer une haute efficacité.

La chaleur résiduaire qui se dégage des moteurs Diesel est utilisée dans des réchauffeurs qui chauffent l'eau et amortissent l'échappement. Ces réchauffeurs sont à même de fournir de la vapeur à 5 livres de pression pour le chauffage de bâtiments. En outre, on dispose ainsi d'eau chaude qu'on peut employer au lavage. Les chaudières qui emploient comme agent de chauffage la chaleur résiduaire coûtent environ $1.00 par b.h.p. à installer et leur coût d'entretien est peu élevé.

On emploie maintenant couramment les épurateurs centrifuges d'huiles de graissage sur les groupes moteurs Diesel. Par l'utilisation de cet équipement, on élimine les impuretés et les matières étrangères de l'huile lubréfiante, ce qui a pour résultat de réduire l'usure des organes mobiles du moteur.

Des expériences répétées ont permis de déterminer que pour une charge donnée sur le moteur, il y a une température d'échappement définie. Afin d'enregistrer les températures d'échappement, il est d'une pratique courante d'installer des thermomètres dans la conduite d'échappement du moteur.

A l'heure actuelle, l'emploi de systèmes refroidisseurs à eau fermés est devenu courant sur les moteurs Diesel. Les systèmes de ce genre ont de nombreux avantages, mais le principal de ces avantages est de maintenir l'eau toujours pure et exempte de particules solides, ce qui empêche la formation d'incrustations sur les parois des cylindres. Les pertes par èvaporation observées dans les systèmes à eau refroidisseurs du type fermé sont de l'ordre de 3 à 10 pour cent du volume manipulé.

L'application de ces divers perfectionnements contribue pour beaucoup à abaisser les frais d'exploitation, ainsi qu'à réduire les temps d'arrêt de service et les frais de réparation. Citons encore comme autre avantage l'augmentation du rendement en chevaux par livre de fuel oil employée. Notons que ces perfectionnements peuvent être appliqués aux anciennes stations tout comme aux nouvelles.

TRAVAUX DE REFECTION

La nécessité de manipuler des quantités importantes de pétrole jour après jour a amené, par raison d'économie, à faire la réfection des canalisations ou pipe-lines, et au lieu de faire les réparations aux endroits mêmes où les conduites ont des fuites et où la corrosion est observée, la nouvelle pratique est de mettre à jour toute la canalisation, de la soulever, puis de la nettoyer, l'inspecter, la souder, la raccommoder, y appliquer des "demi-semelles" ou des manchons, enfin de la revêtir et l'enduire complètement. Des travaux de réfection ou rénovation de ce genre ont été faits, au cours de ces dernières années, sur un grand nombre de canalisations ou pipe-lines principales. La dépense entraînée a sa raison d'être, car, une fois ces travaux effectués, s'ils sont bien faits, la durée d'emploi des canalisations se trouve fortement prolongée, en même temps que les pertes de pétrole et les temps d'arrêt sont réduits au strict minimum.

Toutes ces opérations peuvent s'effectuer pen-

en calentadores, que calientan el agua y silencian el escape. Estos calentadores puedan entregar el vapor a 5 libras de presión, para la calefacción de edificios. El agua caliente se emplea para los fines de lavado. La instalación de calderas de calor gastado cuestan como $1.00 por caballo de fuerza (B.H.P.) y su conservación es económica.

En las centrales de motores diésel se emplean ahora limpiadores centrífugos para el aceite lubricante. El empleo de este equipo sirve para quitar la tierra y otras substancias extrañas del aceite lubricante, lo que reduce el desgaste de las piezas móviles del motor.

Mediante una serie de experimentos se ha visto que, para cada carga dada de motor, hay una determinada o correspondiente temperatura de escape. Se sigue ahora la práctica de instalar termómetros en la tubería de escape del motor, para llevar cuenta de las temperaturas de escape.

Se ha extendido el uso de sistemas cerrados de enfriamiento por agua en los motores diésel. Estos sistemas tienen muchas ventajas, pero la más importante de todas es la conservación de agua limpia, exenta de substancias sólidas, lo que evita la formación de costra en la pared de los cilindros. Las pérdidas por evaporación en los sistemas cerrados de enfriamiento por agua bién construídos son de 3 a 10% del volumen manejado.

El approvechamiento de estos adelantos propende a reducir los gastos de funcionamiento evitando, al mismo tiempo, muchas paralizaciones y reparaciones. Otra ventaja se halla en el mayor rendimiento de fuerza motriz por cada libra de aceite combustible o petróleo consumido. Todos estos progresos puedan aplicarse igualmente bien a plantas antiguas y nuevas.

RECONDICIONAMIENTO

La necesidad de manejar diariamente grandes cantidades de petróleo hace que resulte económico el recondicionamiento o rehabilitación de las tuberías o eleoductos, en lugar de sencillamente reparar aquellos puntos en que hay escapes o que están corroídos. La nueva práctica o método es desenterrar, levantar, limpiar, inspeccionar, soldar, parchar, reforzar, revestir, envolver y reinstalar toda la tubería. Estos trabajos de rehabilitación general se han hecho en importantes sistemas de oleoductos estos últimos años. El gasto se justifica,, pues a continuación de una trabajo bien hecho, se prolonga considerablemente la duración efectiva de la tubería, reduciéndose a un mínimo las pérdidas de petróleo y las paralizaciones del trabajo.

Todo el trabajo se realiza mientras la tubería está en servicio activo. Se hace la zanja, empleando máquina y palas manuales. La tubería se examina con cuidado. Se determinan sus puntos corroídos, escapes por acoplamientos y secciones debiles. Antes de la soldadura general, se reparan los puntos corroídos, mediante parches y empequetaduras, soldándose los parches al tubo. Los acoplamientos en mal estado se soldan en ambos extremos o se revisten con manguitos seccionados normales, que se soldan al tubo. Las juntas débiles se reparan con piezas de refuerzo o con manguitos seccionados.

UTILIZACION DE MATERIALES

Muchos importantes sistemas han reemplazdo su tubería pequeña con tubería grande, para aumentar el rendimiento general. La tubería pequeña quitada ha sido rehabilitada y utilizada de nuevo en otros sistemas. Muchos sistemas de oleoductos mantienen talleres especiales para la rehabilitación de estos materiales.

La rehabilitación de acoplamientos y accesorios de tuberías, reguladores, contadores, magnetos, in-

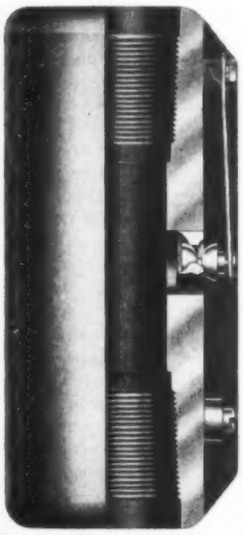
P•T

KICK-OFF UNITS

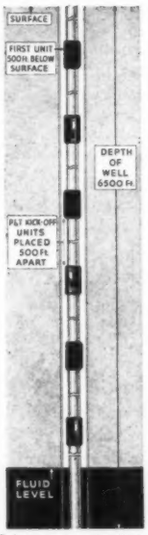
For bringing in New Wells
For Pumping Wells
For Gas Lifting

Pour exploiter de nouveaux puits
Pour le pompage des puits
Pour l'ascension des gaz

Para la explotación de nuevos pozos
Para el bombaje de pozos
Para la ascensión del gas



Internal Type for pumping wells
Type interne pour le pompage des puits
Tipo interno para el bombaje de pozos



P.T. Kick-Off Units on a pumping well
Groupes d'amorçage P.T. sur un puits de pompage
Instalación de válvulas cebadoras P.T. en un pozo de bombaje

Used successfully throughout the world, the P & T Kick-Off Valve is designed in accordance with the gas lift theory, that the most efficient use of lift gas or air for flowing is obtained when the gas or air is all introduced without restriction at the lower end of the flowing column and none introduced at points higher within the flowing column. The P & T Valve Unit also serves as a tubing coupling and will fit any standard A.P.I. tubing. The Kick-Off Valve will start the flow without the use of excessive pressures, brings the well in at working pressure, and eliminates bailing or swabbing. It saves time in cleaning the well of mud and water.

THREE TYPES

INTERNAL TYPE VALVE is recommended for small wells that are produced through the tubing, and for pumping type wells that have high bottom hole pressures where excessive formation gases exist.

By installing this type of unit on tubing as shown by illustration at top of page, the operator is enabled to pump the well with casing pressure closed. The valve permits the gas to lighten the load on rods and pumping equipment, utilizing all formation gas, as the valves let the gas escape through valve port into tubing. It is also recommended for wells on gas lift that are to be kicked off and flowed through tubing.

STANDARD TWO-WAY KICK-OFF VALVE permits the well to be kicked off either through the casing or tubing. With this Unit it is not necessary to swab or bail to displace rotary mud, water, or oil to get the well to flow. The Two-way type will clean the well in two and one-half to three hours after pressure is applied and will permit it to be produced with natural pressure.

EXTERNAL TYPE KICK-OFF VALVE will unload the well between the casing and tubing, with an average kick-off time of ten minutes. It is recommended for wells where casing flow potentials are taken and where tubing is run under pressure.

All three types have same I. D. as tubing.

Write for free bulletin giving complete information. We will be glad to study your well problems and submit recommendations without obligations.

Employée avec succès dans le monde entier, la soupape d'amorçage P & T est une application conforme à la théorie dite d'ascension des gaz, selon laquelle l'emploi le plus efficace du gaz ou de l'air comme agent élévateur pour l'écoulement du puits est réalisé lorsqu'on introduit tout le gaz ou l'air sans restriction à l'extrémité inférieure de la colonne d'écoulement et qu'on n'en introduit pas du tout à des points plus élevés à l'intérieur de la colonne d'écoulement. Le groupe soupape P & T sert aussi de raccord de tubage et peut s'adapter à tout tubage A.P.I. standard. La soupape d'amorçage est à même d'amorcer le jaillissement sans avoir recours à des pressions excessives, de créer dans le puits une pression de travail, tout en éliminant l'ecoppage et l'écouvillonnage. Elle se traduit par une économie de temps dans le nettoyage du puits en eau et boues.

TROIS TYPES

SOUPAPE DE TYPE INTERNE, qui est recommandée pour les petits puits qu'on exploite au moyen de tubage, ainsi que pour les puits du type à pompage qui ont des pressions élevées au fond du puits ou l'on trouve un excès de gaz de formation.

En installant ce type de soupape sur tubage de la manière représentée sur le cliché en haut de la page, l'ouvrier foreur est à même de pomper le puits avec la pression de revêtement fermée. Cette soupape permet aux gaz d'alléger la charge sur les tiges aspirantes et le matériel de pompage, en tirant parti de tous les gaz émanant de la formation, et cela grâce à ce que les soupapes laissent le gaz s'échapper dans le tubage à travers l'orifice de soupape. Elle est aussi recommandée pour les puits exploités par ascension des gaz qui doivent être amorcés et épuisés au moyen de tubage.

SOUPAPE D'AMORÇAGE STANDARD A DEUX DEPARTS, qui permet d'amorcer le puits, soit par revêtement, soit par tubage. En employant ce type de soupape, il n'est pas nécessaire d'écopper ou d'écouvillonner pour sortir les boues de rotatif, eau ou huile, et assurer l'écoulement normal du puits. La soupape du type à deux départs est à même de nettoyer le puits en deux heures et demie ou trois heures après qu'on a appliqué la pression, et permet de faire l'extraction au moyen de la pression naturelle.

SOUPAPE D'AMORÇAGE DE TYPE EXTERNE, qui décharge le puits entre le révetement et le tubage, la durée moyenne de l'amorçage étant de dix minutes. Elle est recommandée pour les puits où l'on prend les potentiels d'écoulement avec revêtement et où l'on exploite par tubage sous pression.

Ces trois types ont tous trois le même diamètre intérieur que le tubage.

Demandez-nous notre notice gratuite qui donne des renseignements complets. Nous sommes à votre entière disposition pour étudier vos problèmes et vous faire des recommandations sans engagement de votre part.

Empleada con éxito en todo el mundo, la válvula cebadora P & T. Kick-Off es una aplicación conforme a la teoría de la ascensión del gas, mediante la cual el empleo más eficaz del gas o del aire, como agente de elevación, para el flujo en un pozo, se realiza cuando se introduce todo el gas o el aire, sin restricción, en el extremo inferior de la columna del flujo o corriente, sin que ninguna parte del gas o del aire se introduzca en puntos más arriba de esta sección de fondo. El sistema de válvulas P & T sirve también de conexión de tubería y puede adaptarse a toda tubería de normas A.P.I. La válvula P.T. arranca el flujo sin necesidad de recurrir a presiones excesivas, establece en el pozo conveniente presión de trabajo y evita el achicamiento o limpieza con escobillón. Ahorra mucho tiempo en la limpieza del barro y agua del pozo.

TRES TIPOS

VALVULA DE TIPO INTERIOR. Se recomienda para los pozos pequeños, explotados mediante tubería, lo mismo que para los pozos de tipo de bombaje, que tienen presiones elevadas al fondo del pozo o están sujetos a un exceso de gas de formación.

Al instalar el presente tipo de válvula en la tubería, como se indica en la ilustración mostrada arriba, el perforador puede bombear el pozo con la presión de revestimiento cerrada. Esta válvula permite al gas aliviar la carga sobre los vástagos de aspiración y el material de bombaje, sacando partido de todos los gases que emanan de la formación, debido a que las válvulas dejan que el gas se escape en la tubería, a través del orificio de la válvula. También se recomienda esta válvula para los pozos explotados for la ascensión del gas, que deben ser cebados y accionados mediante tubería.

VALVULA CEBADORA NORMAL DE DOS VIAS permite cebar el pozo por el revestimiento o por la tubería. Empleando este tipo de válvula, no es necesario achicar o limpiar con escobillón para desplazar el barro de la rotativa, el agua o el aceite, para asegurar el flujo normal del pozo. La válvula del tipo de dos vias puede también limpiar el pozo en dos horas y media o tres, después de aplicada la presión, y le permite producir mediante la presión natural.

VALVULA CEBADORA DE TIPO EXTERIOR. Descarga el pozo entre el revestimiento y la tubería, mediante una cebadura promedia de diez minutos. Se recomienda para los pozos en los cuales se toman los potenciales de flujo con revestimiento o que se explotan por tubería bajo presión.

Estos tres tipos tienen el mismo diámetro interior que la tubería.

Pídanos boletines gratuitos en que damos información completa. Estamos a su disposición para estudiar sus problemas y presentarle recomendaciones incondicionalmente.

P & T KICK-OFF UNITS Stocked at Oklahoma City, Okla., 111 S. E. 29th St. Tel. 7-1761
Kilgore, Texas—219 S. Commerce St. Tel. 179

Price - Trawick Inc.

MANUFACTURERS OF P & T KICK-OFF UNITS
STROUD, OKLAHOMA, U.S.A.

California Representative: Geo. D. Hopkins, 390 Mira Mar Ave., Long Beach, or Avenal, Calif., Cor. Fresno & Union. Tel. 403.

Mc CULLOUGH GUN PERFORATOR

EASY TO OPERATE!

No Electrical Equipment Required

SHOOTS hardened steel projectiles through one or more strings of Well Casing and Cement out into the formation, producing round, clean holes. Gun is light, easy to transport and safe to operate. Run on regular sand line or drilling line. Positive mechanical firing; no electrical or other equipment required. Standard Gun Perforator shoots 10 holes, ½-inch in diameter, on each run. Projectiles ranging from ⅜-inch to ¾-inch also available. Safely handled without special training. Refer to your new 1937 Composite Catalog or write for full information and prices. *Safe, Easy Operation.*

FREE INFORMATION

The Mc Cullough Gun Perforator. Double Acting Rotary Jars, Internal Casing Cutters, Drill Pipe Cutters, Rotary Releasing Spears, Rotary Releasing Sockets, Long Knife Perforators and other successful oil tools are described in your new 1937 Composite Catalog or in free literature sent on request.

DECHARGE des projectiles en acier trempé à travers un ou plusieurs faisceaux de revêtement de puits et de ciment pour atteindre la formation, en produisant des trous nets et bien ronds. Le pistolet fourni est léger, facile à transporter et de toute sécurité à l'emploi. Il se descend dans le puits sur le câble habituel de sables ou le câble de forage. Décharge rigoureusement mécanique; aucun équipement électrique ou autre accessoire n'est nécessaire. Le perforateur-pistolet standard perce 10 trous à chaque descente, ces trous ayant ½ pouce de diamètre. Il est aussi prévu un choix de projectiles allant de ⅜ à ¾ de pouce. Se manoeuvre en toute sécurité sans entraînement spécial. Consultez votre nouveau catalogue combiné de 1937, ou demandez-nous tous détails utiles et prix. *Manoeuvre facile, de toute sécurité.*

RENSEIGNEMENTS GRATIS

Le perforateur-pistolet Mc Cullough. Ebranleurs rotatifs à double effet, Fraises de revêtements internes, Fraises de tuyau de forage, Harpons rotatifs de dégagement, Douilles rotatives de dégagement, Perforateurs à longue lame, et autres outils pétroliers qui ont fait leurs preuves, sont décrits dans votre nouveau catalogue combiné de 1937, ou dans la documentation que nous vous enverrons gratis sur demande.

DESCARGA proyectiles de acero endurecido a través de una o más hileras de revestimiento de pozo y de cemento, para llegar a la formación, produciendo agujeros limpios y bien redondos. La pistola suministrada es liviana, facil. de transportar y bien segura en funcionamiento. Se le hace descender por el pozo con la ayuda del cable corriente de arena o el cable de perforación. La descarga es completamente mecánica. No hay necesidad de ningún equipo eléctrico o de otro accesorio. La pistola perforadora normal perfora 10 agujeros, en cada bajada, con cada agujero de ½ pulgada de diámetro. Se da también elección a proyectiles de ⅜ a ¾ de pulgada. Se maneja con toda seguridad, sin necesidad de entrenamiento especial. Sírvase consultar su nuevo catálogo combinado de 1937, o pídanos directamente información detallada y precios. Esta herramienta se maneja con suma facilidad.

INFORMACION GRATUITA

La pistola perforadora Mc Cullough. Agitadores rotativos de doble efecto. Fresas de revestimientos interiores. Fresas de tubo de perforación. Arpones rotativos de disparo. Encajadores rotativos de disparo. Perforadores de cuchilla larga y otras herramientas petroleras, todas de comprobada eficacia, se describen en su nuevo catálogo combinado de 1937, lo mismo que en nuestro propio catálogo, ejemplar del cual enviaremos gustosamente a todo interesado que lo pida.

Mc CULLOUGH TOOL CO.

2063 East Slauson Ave.
Los Angeles, California, U.S.A.

Branches:
Houston, Tex., Bakersfield and Ventura, Calif.

COMMUNICATION SYSTEMS

In the office of a modern pipe-line system may be found telephone, telegraph, teletype, carrier telegraph and carrier telephone systems of communication. Radio has been used to reach remote pump stations. It has been estimated more than $100,000,000 is invested in communication systems. As much as $500 per mile has been invested by some major pipe line companies.

Modern oil transportation contemplates movement of oil or gasoline direct from point of origin to destination using a minimum of tanks so it is necessary to keep in constant touch with each station and follow movement of the oil or gasoline closely.

Cleaning out trench

To keep track of the oil special forms are used. One form used in handling slugs of refined oils from refineries to destination has space for designing by color on a scaled chart the quantity, kind and position of butane, natural, cracked, straight run and ethyl base gasolines and kerosene. Any of these products may be batched through a modern line satisfactorily with only a small portion mixing.

AUTOMATIC CONTROL

Many devices have been adapted to pipe lines to give full or semi-complete automatic control over different operations. Central stations are equipped with instruments to record pump pressures, speeds of moving parts, temperatures of cooling water and bearings, and depth of fluid in work tanks along the line. Through a series of switches and controls in central stations it is possible to start or stop any pump station.

For gathering lines semi-automatic control has been installed in many places. The lease man starts the pumps to move oil from the tanks to the line and estimates the time necessary to empty the tank and then sets a clock switch to cut off the current to the motor operating the pump when the tank is empty.

While very elaborate systems of control have been worked out it is not probable they will be fully utilized because it has been found advisable to employ men at each station to watch machinery and do other general work.

dant que les conduites sont en service. Pour cela, on ouvre la tranchée, en employant la pelle à main et la pelle mécanique. Ensuite, on fait sortir la canalisation de la tranchée et on la nettoie à la main et à la machine. La conduite est alors inspectée, et on repère ainsi les piqûres, les raccords à fuites et les parties de conduite faibles. Avant de faire des soudures, on a soin de réparer les piqûres par applications d'emplâtres et de joints et en soudant ces emplâtres au tuyau. On soude les raccords défectueux aux deux extrémités, ou encore on les recouvre de manchons fendus standard qu'on soude à la canalisation. Les joints faibles sont réparés au moyens de "demi-semelles" ou de manchons fendus entiers.

RECUPERATION DE MATERIEL

On a supprimé dans les réseaux de pipe-lines le tuyau de petit calibre, et on l'a remplacé par de la tuyauterie de fort calibre afin d'augmenter l'efficacité du système. Le tuyau qu'on a ainsi extrait a été rénové et réemployé dans d'autres secteurs. Un grand nombre de systèmes de pipe-lines possèdent leurs ateliers de réfection de matériel provenant d'ailleurs.

On rénove maintenant d'une manière courante les garnitures, les soupapes, les régulateurs, les appareils enregistreurs, les magnétos, les instruments électriques, et bien d'autres articles, petits et grands. Ces travaux ont donné lieu à une spécialisation poussée, de sorte que cette récupération ou sauvetage de matériel s'est chiffré par plusieurs centaines de milles.

SYSTEMES DE TRANSMISSION

Dans le bureau d'un réseau moderne de pipelines, on trouvera en général tous les moyens de transmission modernes, à savoir téléphone, télégraphe, télétype, télégraphe mobile et téléphone mobile. Ajoutons qu'on a employé la radiophonie pour atteindre les stations de pompage isolées. On a estimé qu'une somme de plus de $100.000.000 est engagée dans des systèmes de transmission dans l'industrie. A noter que certaines des plus importantes compagnies de pipe-lines ont engagé jusqu'à $500 par mille de canalisation.

Les méthodes de transport modernes du pétrole envisagent le transport du pétrole ou de l'essence directement du lieu d'origine à la destination visée, et cela en faisant usage d'un minimum de réservoirs, de sorte qu'il est nécessaire de se maintenir constamment en rapport avec chaque station et de suivre de très près la circulation du pétrole ou de l'essence.

Afin d'enregistrer les mouvements de transport du pétrole, on a recours à certains imprimés. Un de ces types d'imprimés, employé dans la manutention des dépôts de pétroles raffinés se rendant des raffineries au lieu de destination, prévoit un espace pour la désignation par couleur sur un tableau gradué, de la quantité, du type et de la position du butane, de la kérosine, et des essences naturelles, crackées, tout venant et celles à base d'éthyle. Tous ces divers produits peuvent être transportés dans un pipe-line moderne d'une manière satisfaisante, et cela avec seulement une faible portion des huiles se mélangeant.

CONTROLE AUTOMATIQUE

De nombreux dispositifs ont été adaptés aux canalisations ou pipe-lines aux fins d'obtenir un contrôle automatique complet ou semi-complet sur diverses opérations. On équipe des stations centrales d'instruments appropriés afin d'enregistrer les pressions de pompage, les vitesses du mouvestrumentos, eléctricos y otros artículos grandes o pequeños, se ha convertido en práctica corriente. Este trabajo ha llegado a constituirse en una gran especialidad y tenido por efecto salvar materiales que cuestan miles y miles de dólares.

SISTEMAS DE COMUNICACION

En la oficina de los modernos sistema de oleoductos hay teléfono, telégrafo, teletipo, y otros sistemas adelantados de comunicación. Se ha empleado la radiotelefonía para comunicarse con estaciones en puntos remotos. Se calcula que en sistemas de comunicación hay una inversión de más de $100.000.000. Algunas grandes empresas han invertido hasta $500 por cada milla de comunicación directa.

El moderno transporte de productos de petróleo necesita el movimiento del aceite y de la gasolina, desde el punto de origen hasta el punto de destino, valiéndose de un número mínimo de tanques o depósitos. Por esta razón, se presenta la necesidad de montenerse, en todo momento, en contacto directo con cada estación, para seguir exactamente el movimiento del aceite o gasolina.

Para llevar cuenta de estos productos petrolíferos, se emplean blancos o formas especiales. Un formulario empleado para el manejo de porciones de aceites refinados, de las refinerías al punto de destino, comprende escacio para designar, por color, sobre una tabla graduada, la cantidad, clase y posición de las gasolinas de butano, natural, de extracción por "cracking," de primera destilación y con mezcla de etilio. Lo mismo se aplica a las kerosinas. Cualquiera de estos productos puede transmitirse por el moderno sistema de tubería, de un modo satisfactorio, con la mezcla de sólo una pequeña porción.

CONTROL AUTOMATICO

Muchos aparatos se han adaptado a los sistemas de tuberías, para asegurar un control automático completo o casi completo de las diferentes fases del trabajo. Las estaciones centrales están provistas de instrumentos para registrar las presiones de las bombas, velocidades de las piezas móviles, temperaturas del agua de enfriamiento y de los cojinetes, y profunidad del líquido en los tanques o depósitos de trabajo, a lo largo de la línea. Mediante una serie de interruptores y otros gobiernos, en las estaciones centrales, es posible poner en movimiento o hacer cesar el funcionamiento de cualquiera estación de bombas.

En muchos lugares se han instalado controles semiautomáticos en tuberías auxiliares o de recolección. El concesionario o arrendatario pone en movimiento las bombas para transferir el petróleo de los tanques a la tubería, y después de haber calculado el tiempo necesario para vaciar el tanque, ajusta un interruptor cronométrico, para que éste corte la corriente del motor que da funcionamiento a la bomba, tan pronto como se vacíe el tanque.

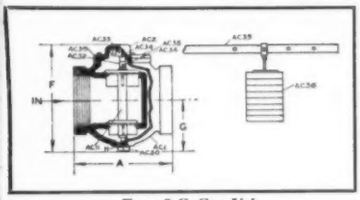
A pesar de que se han establecido los más exactos sistemas de control, lo más probable es que estas precisas instalaciones no podrán funcionar independientemente, pues se ha visto la necesidad de tener empleados en cada estación para vigilar la maquinaria y hacer otros trabajos generales.

PROTECCION CATODICA

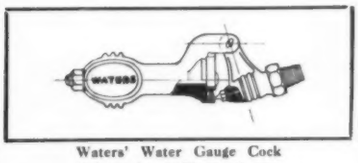
En muchos lugares donde ha sido muy activa la corrosión de la tubería, se ha instalado protección catódica, para retardar la accion corrosiva. Se genera una corriente contínua de bajo voltaje y de bajo amperaje, mediante rectificadores, genera-

SMITH SEPARATORS AND VACOTRAPS

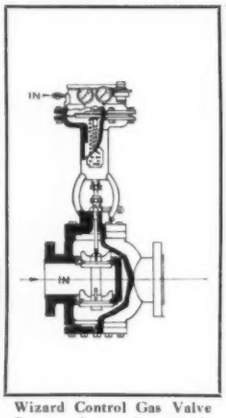
AND COMPLETE LINE OF ACCESSORIES



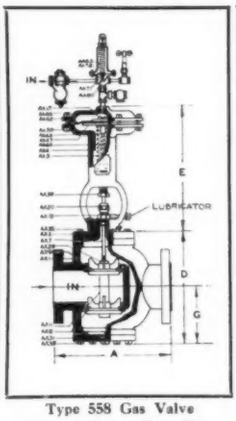
Type 9-G Gas Valve
Soupape à gaz Type 9-G.
Válvula de gas, tipo 9-G.



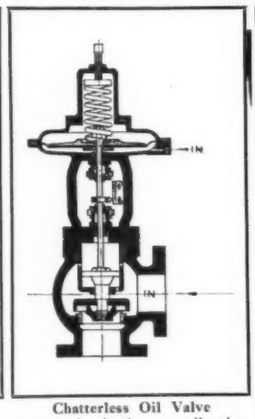
Waters' Water Gauge Cock
Robinet-jauge Waters à eau.
Grifo Water de manómetro de agua.



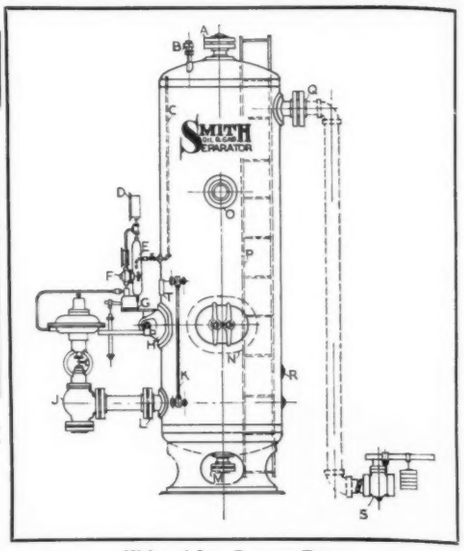
Wizard Control Gas Valve
Soupape à gaz de contrôle "Wizard."
Válvula Wizard de control de gas



Type 558 Gas Valve
Soupape à gaz Type 558.
Válvula de gas, tipo 558.



Chatterless Oil Valve
Soupape à pétrole sans vibration.
Válvula de petróleo sin vibración.



High and Low Pressure Types
Types à basse et haute pression.
Tipos de baja y de alta presión.

SEPARATORS

HIGH AND LOW PRESSURE TYPES—PATENTED

Regular and API-ASME construction—pressures to 3000 lbs. inclusive. Capacities conservative. Interiors efficient in separation. Extremely low gas/oil ratio to storage. Ball bearing float control. Pilot is non-bleed quick-opening type. Valves described elsewhere. Can furnish complete installations from stock.

DESCRIPTION AND FUNCTION OF SEPARATOR INTERIOR

Oil and gas enters Fig. O through deflector, breaking up gas and oil; oil travels centrifugally downward; gas moves upward under separating deck, Fig. U, which is welded tight into separator; gas then enters the cylinder and continues upward where same receives another centrifugal motion through a series of vanes. The fluid removed is carried away from this point to fluid level below by a series of drains. Another Fig. U, separating deck above repeats this process after which the dry gas is discharged from the separator through Fig. Q. The oil is discharged through Fig. L. The shield, Fig. X, over oil outlet eliminates foreign matter to oil valve, and reduces oil/gas ratio to storage.

VACOTRAP AND MEASURING CHAMBER

(Patented Application)

When used as VACOTRAP, eliminates elevating Separator, salvages separator controls; permits atmosphere or vacuum on well and separator. VACOTRAP with aid of residue gas forces fluid to storage.

When used as measuring chamber, a counter registers each discharge. Manufactured as separate unit, vertical to place under Separator, or as part of Separator.

CHATTERLESS-TITESHUT OIL VALVE

Diaphragm actuated; spring controlled; single-seated; composition disc for titeshut; lubricated stuffing box; renewable disc and seat. Slamming open and shut eliminated by dashpot—does not chatter.

TYPE 558 GAS VALVE

Diaphragm actuated; spring controlled; lubricated stuffing box; renewable seats and inner valve; with auxiliary pilot having wide range of adjustment.

TYPE 4200 (WIZARD CONTROL GAS VALVE)

Diaphragm operated; spring controlled; Bourdon tube type pilot; sensitive; wide range of adjustment; easily converted from relief to reducing regulator; renewable seats and inner valve.

TYPE 9-G GAS VALVE

Screwed or flanged globe, semi-steel; stainless iron trim; double-seated; full line capacity; lever and weight operated.

WATERS' WATER GAUGE COCK

(Patented)

Pressure is applied to the nozzle with weighted handle at precise angle that permits using medium weight handle—withstanding 850 lbs. pressure. Monel nozzle, composition reversible seat. ½" and ¾" sizes.

Write For Complete Illustrated Literature

SEPARATEURS

TYPES A BASSE ET HAUTE PRESSION—BREVETES

Construction standard et API-ASME—pressions allant jusqu'à 3000 lbs. Les capacités sont fixées sur une base conservative. Intérieurs efficaces en séparation. Rapport très bas entre indice gaz/pétrole et magasinage. Commande à flotteur sur roulement à billes. Guide du type à ouverture rapide et sans suintement. Soupapes décrites ailleurs. Fourniture d'installations complètes sur notre stock.

DESCRIPTION ET FONCTION DE L'INTERIEUR DU SEPARATEUR

Le pétrole et le gaz entrent (Fig. O) par un déflecteur, qui sépare gaz et pétrole; le pétrole descend d'une manière centrifuge; le gaz monte sous la plateforme de séparation (Fig. U), qui est soudée solidement dans le séparateur; le gaz pénètre alors dans le cylindre et continue sa marche vers le haut où il est soumis à une nouvelle action centrifuge en passant à travers une série de vannes. Le fluide extrait est emmené de ce point au niveau liquide en-dessous par une série de drains. Une autre plateforme de séparation au-dessus (Fig. U), répète ce procédé, après quoi le gaz sec est décharge du séparateur par Fig. Q. Le pétrole est déchargé par Fig. L. Le bouclier, Fig. X, prévu au-dessus de l'ouverture de sortie du pétrole, éloigne les matières étrangères de la soupape à pétrole, tout en réduisant l'indice pétrole/gaz par rapport au magasinage.

CHAMBRE DE MESURE "VACOTRAP" (APPLICATION BREVETEE)

Quand on l'emploie comme VACOTRAP (trappe à vide), elle supprime le séparateur élévateur, épargne les commandes de séparateur; permet d'établir la pression atmosphérique ou le vide sur le puits et le séparateur. La trappe à vide VACOTRAP, avec le concours des gaz résiduaires, refoule le fluide dans le réservoir de magasinage.

Quand on l'emploie comme chambre de mesure, un compteur enregistre chaque décharge. Fabriquée comme unité séparée, verticale pour placer sous le séparateur, ou comme partie du séparateur.

SOUPAPE A PETROLE SANS VIBRATION

Actionnée par diaphragme; contrôlée par ressort; siège unique; disque en composition d'obturation parfaite; presse-étoupe lubréfié; disque et siége remplaçables. Elimination par amortisseur du claquement à l'ouverture et à la fermeture—opération silencieuse.

SOUPAPE A GAZ TYPE 558

Actionnée par diaphragme; contrôlée par ressort; presse-étoupe lubréfié; sièges et soupape intérieure remplaçables; avec guide auxiliaire d'une grande amplitude de réglage.

TYPE 4200 (SOUPAPE A GAZ DE CONTROLE "WIZARD."

Actionnée par diaphragme; contrôlée par ressort; pilote du type à tube Bourdon; grande sensibilité; grande amplitude de réglage; se convertit facilement de régulateur de dégagement en régulateur de réduction; sièges et soupape intérieure remplaçables.

SOUPAPE A GAZ TYPE 9-G

Rotule vissée ou bridée, semi-acier; garniture en fer inoxydable; double siége; pleine capacité de conduite; commandée par levier et contrepoids.

ROBINET-JAUGE WATERS A EAU

(Breveté)

La pression est appliquée à la buse avec un levier à poids sous un angle précis qui permet l'emploi d'un levier à poids moyen—à même de soutenir une pression de 850 lbs. Buse en métal Monel, siége réversible en composition. Grandeurs de ½ et ¾ de pouce.

Documentation illustrée complète sur demande

SEPARADORES

TIPOS DE BAJA Y DE ALTA PRESION—PATENTADOS

Construcción corriente y según los patrones de la API y ASME, con presiones hasta de 3000 libras. Las capacidades se fijan sobre una base conservativa. Interiores muy eficaces para la separación. Relación muy baja entre la proporción de gas y petróleo y el almacenaje. Control por flotador montado en cojinetes de bolas. Guía de tipo de abertura rápida sin escape. Las válvulas se describen en otra parte de este anuncio. Suministramos instalaciones completas de nuestras propias existencias.

DESCRIPCION Y FUNCION DEL INTERIOR DEL SEPARADOR

El petróleo y el gas entran (Fig. O) por un deflector, que separa el gas y el petróleo; el petróleo desciende por acción centrífuga el gas sube debajo de la plataforma de separación (Fig. U), la cual está soldada sólidamente en el separador; el gas entra ahora en el cilindro y continúa su marcha hacia arriba, donde es sometido a una nueva acción centrífuga, al pasar por una serie de paletas. El flúido extraído es llevado de este punto al nivel líquido abajo, mediante una serie de desagües. Otra plataforma de separación abajo (Fig. U) repite el procedimiento, y a continuación de esto, el gas seco se descarga del separador a traves de Q. El petróleo se descarga por L. El colador X en la salida del petróleo, evita la entrada de substancias extrañas en la válvula de petróleo y reduce así la proporción de petróleo y gas en relación con el almacenaje.

CAMARA DE MEDICION Y "VACOTRAP" (APLICACION PATENTADA)

Cuando se emplea como "Vacotrap" (trampa de vacío) se suprime el separador de elevación, se ahorran los controles de separador; se permite establecer presión atmosférica o vacío en el pozo y el separador. La trampa de vacío, con la ayuda del gas residuario, obliga al líquido a pasar al depósito de almacenaje.

Cuando se emplea como cámara de medición, un contador registra cada descarga. Fabricada como unidad separada, vertical para colocarse debajo del separador, o como parte del separador.

VALVULA DE PETROLEO SIN VIBRACION

Accionada por diafragma; controlada por resorte; con un solo asiento; disco de composición para perfecta obturación; prensaestopa lubricado; disco y asiento reemplazables. Eliminación por amortiguador del golpeteo de la apertura y cierre. No hay vibración ruidosa.

VALVULA DE GAS, TIPO 558

Accionada por diafragma; controlada por resorte; prensaestopa lubricado, asientos y válvula interior reemplazables; con una guía auxiliar que asegura una amplia escala de regulación.

TIPO 4200 (VALVULA "WIZARD" DE CONTROL DE GAS)

Accionada por diafragma; controlada por resorte; piloto de tipo tubular Bourdon; gran sensibilidad; amplia escala de regulación; se convierte fácilmente de regulador de desahogo en regulador de reducción; asientos y válvula interior reemplazables.

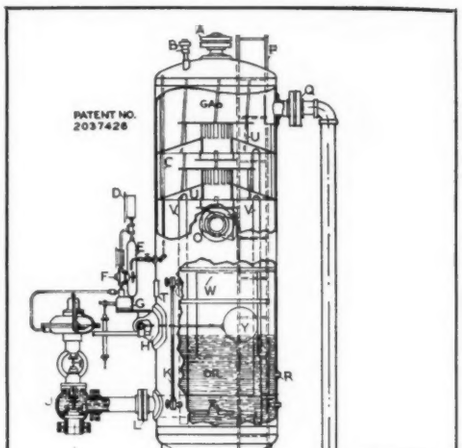
VALVULA DE GAS, TIPO 9-G

Esférica atornillada o con pestaña, de semiacero, con guarnición de acero inoxidable; doble asiento; completa capacidad de conducción; de funcionamiento por palanca o contrapeso.

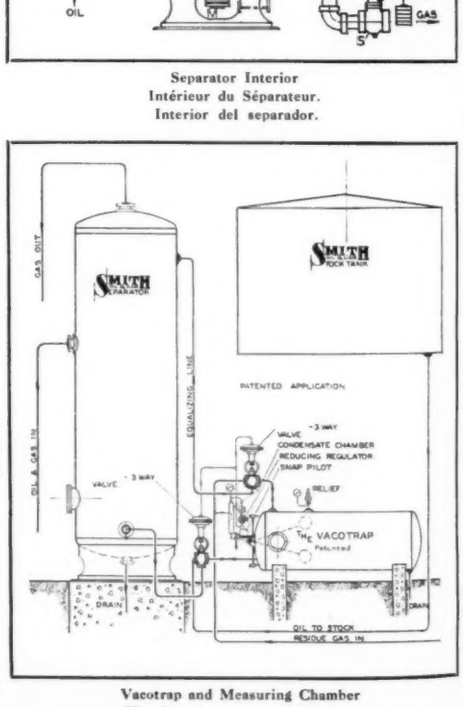
GRIFO WATERS DE MANOMETRO DE AGUA

La presión se aplica a la boquilla con una palanca de peso, a un ángulo preciso, que permite el empleo de una palanca de peso mediano, pudiendo resistir una presión de 850 libras. Boquilla de metal Monel, asiento reversible, de composición especial. Tamaños de ½ y de ¾ de pulgada.

Pídanos información ilustrada.



Separator Interior
Intérieur du Séparateur.
Interior del separador.



Vacotrap and Measuring Chamber
Chambre de mesure "Vacotrap."
Cámara de medición y "Vacotrap".

SMITH SEPARATOR CORP.

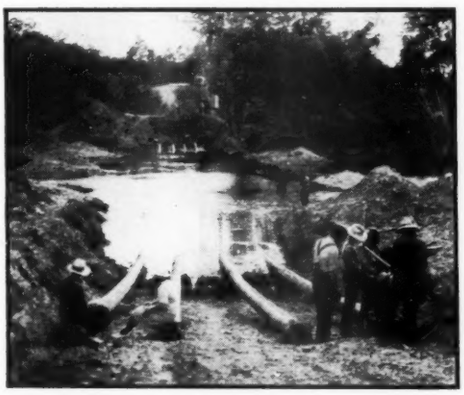
TULSA, OKLAHOMA, U.S.A.

Export Representative: Oilfield Equipment Co., 30 Church Street, New York City

CATHODIC PROTECTION

In many places where corrosion along pipe lines has been active cathodic protection has been installed and has greatly retarded corrosive action. A low voltage, low amperage direct current is generated by rectifiers, motor or engine-driven generators and lately by wind-driven generators. This current is transmitted through line wires carried on poles to a ground bed. This ground bed is located at from 300 to 500 feet from the pipe line, preferably in wet ground, and is a hole dug in the earth and filled with scrap iron and other junk metal. Before the earth is shoveled back into the hole it is mixed with several hundreds pounds of rock salt.

The direct current from the generator enters the ground bed and passes to and along the pipe line to connection through which the current leaves



Four lines crossing river

the line and returns to the generator. Stray currents tend to flow into the ground bed and are there neutralized.

Sections where corrosion has developed leaks are welded before the cathodic protection system is installed and it has been noted few leaks develop after the protective system starts to function.

AERIAL PHOTOGRAPHY

Right of ways and stream crossings along pipe lines are now being mapped satisfactorily by aerial photography. These surveys are made by planes flying the proposed routes and making a series of pictures covering considerably more width of territory than the right of way. When the pictures are studied, using a special type sterescope, the contour of the land is plainly visible.

Stream crossings, especially of large streams, have long presented special problems for pipe line engineers. Using aerial photography several sets of pictures are taken up and down the river. These are studied and two or three alternative crossings selected and the plane then flies the area back of each crossing to develop all features of each possible approach. With this information at hand it is possible to lay out the right of way of the line to the best advantage and much time and cost is saved. Photographing over a stream frequently shows conditions under water which aid in making selection of crossing sites.

GAS LINES

With increased demand for natural gas in eastern cities it has been necessary to increase the carrying capacity of major gas systems. Modern gas lines are mostly of welded construction and suitable for relatively high pressures. Increased capacity can be secured by installing additional compressor stations. During the past year several thousand horsepower in gas engine driven compressors have been added. Some of these are driven by gas engines, some by electric motors and some by generators driven by wind motors. The current is transmitted by line wires carried on poles to a ground bed. This ground bed is located at from 300 to 500 feet from the pipe line, preferably in wet ground, and is a hole dug in the earth and filled with scrap iron and other junk metal. Before the earth is shoveled back into the hole it is mixed with several hundreds pounds of rock salt.

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PROTECTION CATHODIQUE

A de nombreux emplacements où la corrosion était observée sur le parcours des pipe-lines, on a fait l'installation du système de protection cathodique, ce qui a beaucoup retardé l'action corrosive. Un courant continu de faible voltage et de faible ampérage est généré par des rectifieurs, des générateurs à moteur électrique ou à essence, et plus récemment par des générateurs mus par le vent. Ce courant est transmis par des fils portés sur des poteaux à un couchis de terrain. Ce couchis de terrain est situé à 300 ou 500 pieds du pipe-line, de préférence dans du terrain humide, et consiste d'un trou creusé dans la terre et rempli de ferraille ou autres métaux de rebut. Avant de rejeter la terre dans le trou pour le boucher, on la mélange avec plusieurs centaines de livres de sel de roche.

Le courant continu produit par le générateur pénètre dans le couchis de terrain, puis rejoint la canalisation pour la suivre et atteindre une connexion par l'entremise de laquelle le courant quitte la conduite et retourne au générateur. Les courants de dispersion tendent à se rendre dans le couchis de terrain en question, où ils sont neutralisés.

Les parties où la corrosion a fini par provoquer des fuites sont tout d'abord soudées avant de faire l'installation du système dit de protection cathodique, et on a observé qu'un très petit nombre de fuites sont survenues après que le système protecteur en question a été mis en jeu.

PHOTOGRAPHIE AERIENNE

On fait maintenant d'une manière très satisfaisante les plans de carte des droits de passage et des passages de cours d'eau sur le parcours des pipe-lines, et cela au moyen de la photographie aérienne. Ces plans sont dressés par des avions qui survolent les itinéraires proposés et prennent une série de photographies englobant une étendue de territorie beaucoup plus vaste que celle du droit de passage. Lorsqu'on étudie ces photographies, en employant un stéréoscope d'un type spécial, le contour du terrain ressort nettement.

Les passages de cours d'eau, en particulier lorsqu'il s'agit de larges fleuves, avaient toujours présenté des problèmes spéciaux pour les ingénieurs de pipe-lines. Par l'emploi de la photographie aérienne, on prend plusieurs séries de photos en montant et en descendant le cours de la rivière. On en fait alors l'étude, puis on sélectionne deux ou trois passages à retenir; l'avion retourne alors survoler la superficie à l'arrière de chaque passage envisagé afin de bien préciser tous les aspects

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FOTOGRAFIA AEREA

La fotografía aérea ha resultado muy satisfactoria para hacer planes de derechos a la vía, cruces y otros detalles topográficos, a lo largo del terreno del sistema de tuberías. Estos estudios se hacen en aeroplanos que vuelan sobre las rutas proyectades. Las vistas tomadas desde el aire cubren una zona mucho más ancha que la requerida para el derecho a lo vía. Al estudiar las vistas, con la ayuda de un estereoscopio de tipo especial, se presenta bien claro y definido el contorno del terreno.

Los cruces de riachuelos, especialmente los más caudalosos, desde hace tiempo han presentado problemas especiales a los ingenieros de tubería. Con la ayuda de la fotografía aérea, se toman numerosas vistas del riachuelo por cruzarse. Estas se estudian y finalmente se eligen dos o tres cruces posibles o convenientes. El fotógrafo sale en el aeroplano a sacar más vistas de estos puntos elegidos, incluyendo en ellas todos los detalles posibles. Con esta información fotográfica, se puede entonces trazar el curso o derecho a la vía, con relativa facilidad y con gran ahorro de tiempo y gastos. La fotografía de un riachuelo, tomada desde un aeroplano, muestra, a menudo, las condiciones submarinas, que en muchos casos son los factores determinantes en la selección de los puntos de cruce.

TUBERIAS DE GAS

Debido a la creciente demanda de gas natural en las ciudades del este de los Estados Unidos, ha sido necesario aumentar la capacidad conductiva de muchos importantes sistemas transmisores de gas Las modernas tuberías de gas son, por lo general, de construcción soldada, y adecuadas a presiones relativamente altas. Se obtiene mayor capacidad conductiva o transmisora mediante la instalaciones de adicionales estaciones de compresores. Durante el año pasado, se han instalado numerosos compresores accionados por motores de gas, que representan la adición de millares de caballos de fuerza, a las facilidades de varios importantes sistemas. Este invierno, se manejarán diariamente millones de pies cúbicos adicionales de gas.

En muchas tuberías de gas se han presentado irregularidades a consecuencia de la formación de cristales de hielo en su interior, conducente a obturación parcial. Este defecto se evita ahora secando bien el gas. Se quita toda la humendad pasando el gas, bajo presión de tubería, por depuradores que contienen cloruro de calcio. Regulando la presión y el volúmen, las tuberías pueden ahora mantenerse independientes de cristales de hielo, aun bajo las más bajas temperaturas.

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Only uniform quality can give you the satisfaction you demand from oil field equipment . . Through proved quality, Larkin gives you just what you want—drilling and fishing tools that are strong, safe, efficient . . Export trade has long given preference to Larkin sand pumps and packers, as well as the rest of the extensive Larkin line of reliable drilling and fishing tools . . Write today for our catalog.

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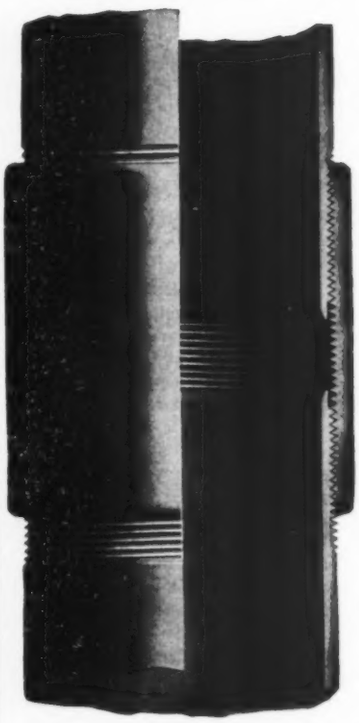
Mediante el empleo de los productos Larkin, contará Ud. con la seguridad de completa satisfacción . . Fabricamos el surtido de herramientas petroleras más completo y más seguro del mercado . . Los obturadores "hechos a la medida", es decir, adaptados a cada caso, constituyen nuestra especialidad . . Podemos suministrar nuestra perfeccionada bomba de arena en cualquier tamaño que se pida . . El surtido más completo de herramientas de perforación y de pesca, ofrecido a venta o en arriendo bajo contrato . . Sírvase pedirnos en seguida nuestro catalogo y adope sin pérdida de tiempo, el material Larkin.

LARKIN & COMPANY
BUTLER, PA.

For Oil Fields



We supply all kinds of seamless and welded tubes above 12½ inch o.d. such as

Casings
Drive Pipes
Line Pipes

for Gas, Water, Steam, Oil, Gasoline and other mediums.

Nous fournissons tous genres de tubes soudés ou sans soudure au-dessus de 12½ pouces de diamétre extérieur, pour

Revêtements
Tuyaux de commande
Tuyaux de conduite

pour le gaz, l'eau, la vapeur, le pétrole, l'essence et autres fluides.

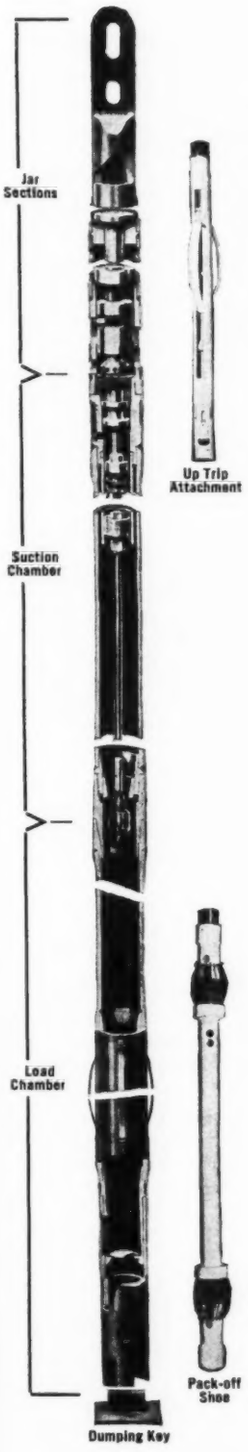
Suministramos toda clase de tubos sin costura y soldados de más de 12½ pulgadas de diámetro exterior, para

Revestimientos
Propulsión
Conducción

para gas, agua, vapor, petróleo, gasolina y otros agentes presentes en la explotación de yacimientos petrolíferos.

RV

Grossrohr-Verband Düsseldorf (Germany)



THE CAVINS
AUTOMATIC HYDRAULIC
SUCTION BAILER and FISHING TOOL

The CAVINS AUTOMATIC HYDRAULIC SUCTION BAILER is invaluable for use in breaking hard packed sand bridges; removing sand bridges from tubing or running through partially collapsed pipe with the small size; fishing out moveable junk; cleaning out on top of and around large fish; and for ordinary clean-out work. Loading is automatic and instantaneous—recoveries are quickly discharged at the surface under the regulated pressure retained in the tool.

When assembled to the CAVINS Bailer, the Up-Trip attachment and the Pack-Off Shoe transforms this tool into an outstanding perforation washer. The hydraulic forces present in the well are utilized to pull sand, mud, shale, etc., from behind the pipe and through the perforations.

LE NETTOYEUR CAVINS A ASPIRATION HYDRAULIQUE AUTOMATIQUE est d'une aide précieuse pour briser les ponts de sable serré et dur; pour chasser du tubage les ponts de sable ou pour faire circuler dans des tuyaux partiellement aplatis avec le petit calibre; pour repêcher tout outil ou toute ferraille extrayable; pour nettoyer au-dessus et autour d'un grand objet repêché; et enfin pour travaux courants de nettoyage. Le chargement est automatique et instantané—les objets ainsi recouvrés sont promptement déchargés à la surface grâce à la pression contrôlée qu'on maintient dans l'outil.

Lorsqu'on adjoint à cet écopeur CAVINS l'accessoire remontée et la sabot de bourrage, on transforme cet outil en un remarquable laveur de perforations. Les forces hydrauliques présentes dans le puits sont utilisées pour extraire le sable, les boues, les schistes, etc. de derrière le tuyau et sur le parcours des perforations.

El LIMPIADOR AUTOMATICO DE ASPIRACION HIDRAULICA Y HERRAMIENTA DE PESCAR CAVINS es una ayuda efectiva para romper acumulaciones de arena apretada y dura, para quitar de la tubería acumulaciones de arena o para circular por tubos parcialmente aplastados; sirve también para pescar toda pieza de hierro, que pueda extraerse; para limpiar por debajo y alrededor de todo objeto grande pescado, y en fin, para trabajos corrientes de limpieza. Su acción es automática e instantánea. Los objetos así recuperados salen rápidamente a la superficie, gracias a la presión regulada que se mantiene en la herramienta.

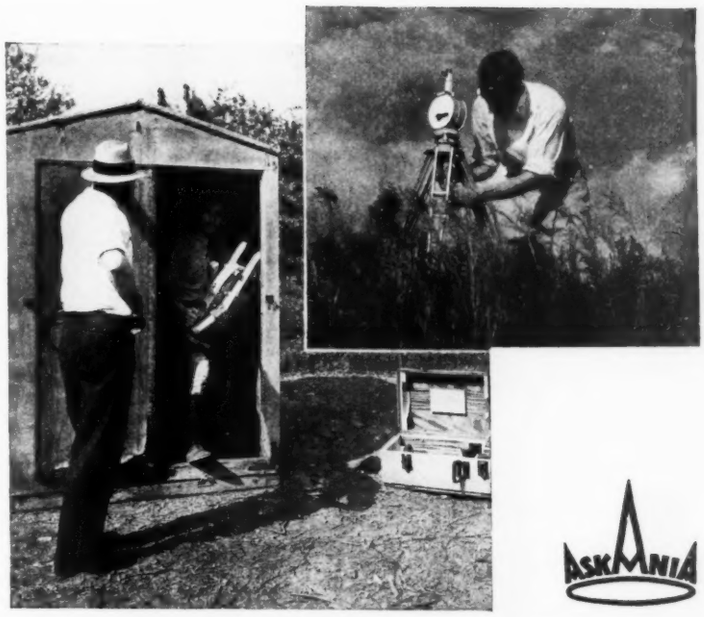
Cuando en el limpiador CAVINS se instalan el dispositivo de levantamiento y la zapata de obturación, se forma entonces una admirable herramienta de limpieza de perforaciones. Las fuerzas hidráulicas presentes en el pozo se utilizan para extraer la arena, los barros, los esquistos, etc. que hay detrás del tubo y en las perforaciones.

THE CAVINS COMPANY

2853-73 Cherry Avenue, Phone 414-14 414-60
LONG BEACH, CALIFORNIA. U.S.A.

Cable Address: "Cavins, Long Beach"
Foreign Representative: R. J. Eiche

Right: Sand bailed out by the Cavins in just a few hours. (Most of the sand had already been hauled away . . see wheel tracks).



ASKANIA

MULTIPLE METHOD
of Subsurface Prospecting an Accepted Procedure

Geophysics helps to limit drilling failures by the selection of the most promising areas for oil and gas accumulation. Many large operating companies use more than one method of subsurface prospecting as an accepted procedure. Why don't you follow this proven, accepted practice in your geophysical work? Askania equipment will help you to reduce guess work and possible errors.

We will gladly confer with you regarding your requirements in geophysical instruments. Ask us for cost data and other information regarding the torsion balance, magnetometer or seismic equipment. A letter or a 'phone call will be handled promptly.

La géophysique est d'un concours précieux pour réduire les forages infructueux, et cela par la sélection des régions qui promettent le plus d'avoir de fortes accumulations de pétrole et de gaz naturel. Un bon nombre de compagnies exploitantes font usage de plusieurs méthodes de prospection du sous-sol d'une façon suivie. Votre intérêt est d'adopter cette pratique démontrée et agréé dans vos travaux géophysiques. Le matériel Askania vous aidera à réduire les tâtonnements et les possibilités d'erreurs.

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La geofísica es una ayuda muy efectiva para limitar o reducir las perforaciones infructuosas, mediante la selección de regiones que más prometen en el sentido de acumulaciones de petróleo y gas natural. Muchas grandes compañías explotadoras siguen varios métodos de reconocimiento, como práctica corriente. Por qué no sigue Ud. esta práctica, que ha tenido tanta aceptación, por sus excelentes resultados, en conexión con sus trabajos geofísicos? El equipo Askania le ayudará a reducir sus equivocaciones y posibilidades de errores.

Estamos a su disposición para discutir con Ud. sus necesidades en el sentido de instrumentos geofísicos. Sírvase pedirnos datos relativos al costo de explotación e información detallada sobre la balanza de torsión, el magnetómetro y los instrumentos sísmicos. Su solicitud recibirá inmediata y esmerada atención.

AMERICAN ASKANIA
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For deepest drilling, for worst conditions, we offer you the new U. S. Matchless Rotary Hose (9500 lbs. burst). Stronger throughout, yet flexible—reinforced at each end for 36″ by an exclusive U. S. method—this hose is built to take the bruising strains of couplings, vibration, bends, and high pressure.

For less severe service, use the new U. S. Peerless Rotary Hose (7000 lbs. burst), also reinforced at each end for 36″. Stronger than ever before, but still the most flexible rotary hose in the field.

Maintaining representatives and branches in oil fields throughout the world the United States Rubber Export Co., Ltd. offers a complete line of hose, belting and packing for the oil industry. We solicit your inquiries. Catalogues and detailed information on request.

Para la perforación más profunda, para las condiciones más desfavorables, ofrecemos la nueva manguera flexible rotativa U. S. "Matcheless" (ensayada a una presión de 9500 libras). Más firme, en todo sentido, y al mismo tiempo flexible, reforzada en cada extremo a 36 pulgadas, por un método U. S. exclusivo, esta manguera ha sido especialmente construída para soportar los esfuerzos y contusiones causadas por los acoplamientos, las trepidaciones, los codos y las altas presiones.

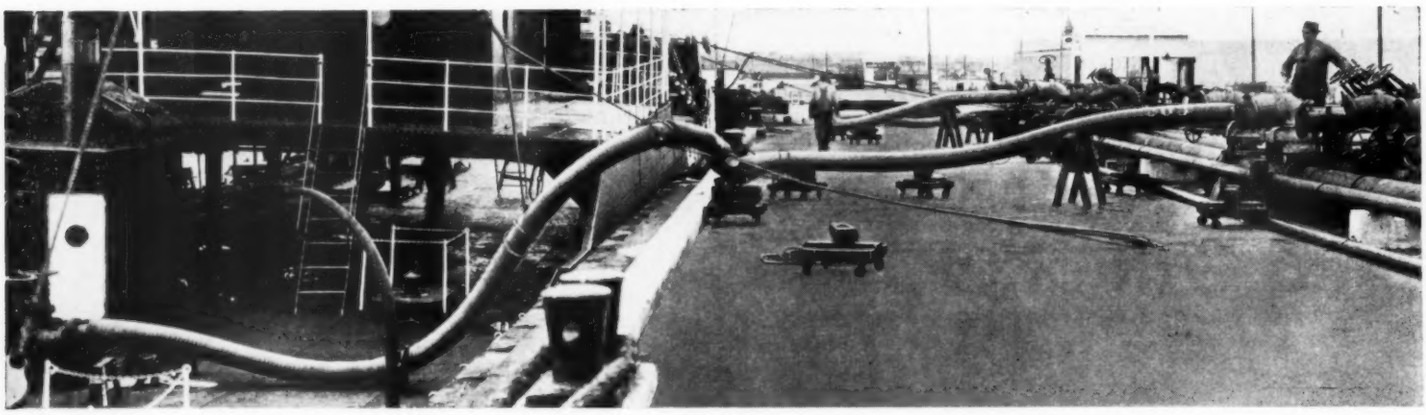
Para un servicio menos exigente, recomendamos la nueva manguera flexible rotativa U. S. "Peerless" (ensayada a una presión de 7000 libras), reforzada también en cada extremo a 36 pulgadas. Más firme que nunca, pero siempre, la manguera flexible rotativa más práctica del mercado.

La United States Rubber Export Co., Ltd., que tiene representantes y sucursales en los campos petrolíferos de todo el mundo, ofrece un surtido completo de tubería flexible, correas de transmisión y empaquetaduras para la industria del petróleo. Queda Ud. invitado a consultarnos. A solicitud enviaremos catálogos e información detallada.

Pour les forages les plus profonds, pour les conditions les plus défavorables, nous vous offrons le nouveau flexible rotatif U. S. "Matchless" (essai d'éclatement à 9500 lbs.) Plus fort d'un bout à l'autre, pourtant souple—renforcé à chaque bout sur 36 pouces par une méthode U. S. exclusive—ce flexible est construit pour supporter les efforts et contusions causés par les raccords, les trépidations, les coudes, et les hautes pressions.

Pour un service moins dur, faites usage du nouveau flexible rotatif U. S. "Peerless" (essai d'éclatement à 7000 lbs.), renforcé lui aussi à chaque bout sur 36 pouces. Plus fort que jamais, mais pourtant toujours le flexible rotatif le plus souple dans la branche.

La United States Rubber Export Co., Ltd., qui a des représentants et des succursales dans les champs de pétrole du monde entier, offre une gamme complète de tuyauterie souple, courroies de transmission et garniture pour l'industrie du pétrole. Vous êtes invité à nous interroger. Catalogues et détails complets sur demande.



U. S. Amazon Oil Suction and Discharge Hose has been delivering outstanding service at terminals throughout the world for more than 30 years. Manufactured in various constructions for varying conditions of dock and submarine work. Descriptive folder upon request.

La manguera U. S. "Amazon" de aspiración y descarga de petróleo, desde hace más de 30 años, ha venido dando un servicio irreprochable en las estaciones terminales en todas partes del mundo. Se ofrece en varios tipos de producción para diversas aplicaciones submarinas y de muelles. Folleto descriptivo a solicitud.

Le flexible U. S. "Amazon" d'aspiration et décharge pétrolière assure depuis plus de 30 ans un service impeccable dans les stations terminus du monde entier. Il en est prèvu divers types pour divers emplois sous-marins et dans les docks. Dépliant descriptif sur demande.

United States Rubber Export Co., Ltd.

1790 BROADWAY **NEW YORK**

pressors has been installed on several large trunk lines and this winter millions of feet of extra gas will be handled each day.

Trouble has been experienced in many gas lines with crystals of ice forming inside the pipe and partially closing it. It is now overcome entirely by properly drying the gas. All moisture is removed by passing the gas under line pressures through scrubbers containing calcium chloride. The gas is stabilized and natural gasoline extracted. By controlling pressure volume lines can be kept free of ice crystals even in very low temperatures.

GASOLINE LINES

From a very small beginning gasoline pipe lines have been expanded into great systems transporting not only gasoline but many other refined products from refinery centers to points of consumption.

Engineers have been studying gasoline pipe line problems carefully, as they differ in many details from oil pipe lines, and by exchange of information have built up many standard practices now useful in designing pipe lines to carry refined products.

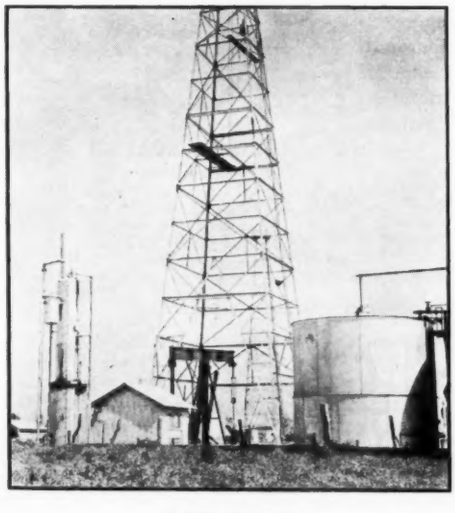
AIR FILTERING

Recurring dust storms have aroused operators to realization of the necessity and economy of filtering air for use in internal combustion engines and compressors. Air filters to clean ordinary air of foreign materials are essential to well equipped engine and compressor plants and will increase the efficiency and lower cost of operating.

High filtering efficiency, while essential, must be combined with design of equipment to prevent clogging of the filter medium and increasing fuel consumption or requiring frequent cleaning. Engine and compression oil filters are classed as oil wetted and oil bath type.

Oil wetted types are available in panel or circular form. The element is dipped in oil after cleaning and before placing in service, the oil being used to start adhering of dust after which the natural attraction of dust for dust will continue. The oil wetted filters contain three important features, efficiency in filtration, minimum of restriction, and long service between cleaning.

Oil bath type filters incorporate a quantity of oil carried to the filter element by the air velocity and automatically washes the element of the dust collected and deposits it in the oil sump. The air is first subjected to cleansing by passing it through the agitated oil. The overall efficiency of the oil bath type filter is increased, the inherent restriction remains constant and service period between required attention is considerably lengthened.



Water knockout

de chaque accès possible à ces passages. Une fois qu'on dispose de ces renseignements, il est possible d'établir le droit de passage de la conduite dans les meilleurs conditions, et on économise ainsi beaucoup de temps et de frais. Les prises de photos audessus de cours d'eau font fréquemment ressortir les conditions existantes sous l'eau, ce qui aide dans la sélection rationnelle de sites de passages.

CONDUITES DE GAZ NATUREL

Par suite de la demande croissante en gaz naturel des villes de l'Est, on a été amené à augmenter la capacité de transport de nombreux systèmes principaux de gas naturel. Les conduites modernes de gaz naturel sont pour la plupart de construction soudée et peuvent résister à des pressions relativement assez élevées. On peut obtenir un accroissement de capacité en installant des stations supplémentaires de compresseurs. Au cours de l'an dernier, on a installé pour plusieurs milliers de chevaux de compresseurs actionnés par moteur à essence sur plusieurs grosses conduites principales, et, au cours de cet hiver, on pourra assurer chaque jour en plus de nouveaux millions de pieds de gaz naturel.

On a eu quelques ennuis sur de nombreuses conduites faisant le transport du gaz naturel par suite de la formation de cristaux de glace à l'intérieur du tuyau, ce qui bouche partiellement les canalisations. Toutefois, on s'en est rendu maître complètement en séchant convenablement le gaz. On en élimine toute l'humidité en faisant passer ce gaz, soumis à des pressions de conduite, à travers des scrubbers ou épurateurs contenant du chlorure de calcium. On stabilise le gaz naturel et on en extrait l'essence naturelle. En contrôlant la pression et le volume, on peut maintenir les conduites exemptes de cristaux de glace, et cela même à des températures très basses.

CONDUITES D'ESSENCE

D'abord d'une importance réduite, les pipe-lines ou conduites d'essence ont pris une extension considérable et ont fini par former de vastes réseaux qui transportent non seulement l'essence, mais aussi un grand nombre d'autres produits raffinés entre les centres de raffinage et les points de consommation.

Les ingénieurs ont étudié de près les problèmes de pipe-lines à essence, car ces derniers diffèrent à de nombreux points de vue des conduites on pipelines à pétrole, et c'est par l'échange d'informations qu'ils ont réussi à élaborer de nombreuses pratiques standard maintenant fort utiles dans la construction des pipe-lines employés au transport des produits raffinés.

FILTRATION DE L'AIR

La fréquence des tempêtes de poussière a amené les exploitants à se rendre compte de la nécessité et de l'économie de la filtration de l'air sur les moteurs à combustion interne et sur les compresseurs. Pour débarrasser l'air courant des matières étrangères, les épurateurs d'air sont essentiels aux groupes de moteurs et compresseurs bien équipés, leur emploi se traduisant par de meilleurs rendements et une exploitation plus économique.

Toute essentielle qu'elle soit, la filtration de grande efficacité doit de toute nécessité être combinée avec le type d'équipement pour éviter le colmatage de l'élément filtrant, l'augmentation de consommation en carburant ou la nécessité de nettoyer fréquemment. Les filtres à huile de compresseurs et de moteurs se divisent en deux types, le type à humectation d'huile et le type à bain d'huile.

Les types à humectation d'huile sont offerts en forme à panneau ou circulaire. L'élément est trempé dans l'huile avant le nettoyage et avant la mise en service, l'huile servant à amorcer l'adhérence de la poussière après quoi l'attraction naturelle de la poussière pour la poussière se charge de continuer l'épuration. Les filtres à humectation d'huile se distinguent par trois caractéristiques principales: l'efficacité de la filtration, un minimum de restriction, et un long service avant de demander un nettoyage.

Les filtres du type à bain d'huile incorporent une certaine quantité d'huile amenée à l'élément filtrant par la vélocité de l'air, ce qui lave automatiquement l'élément de la poussière recueillie et la dépose dans le puisard d'huile. L'air est tout d'abord soumis à une épuration en passant à travers l'huile agitée. L'efficacité générale du filtre du type à bain d'huile se trouve augmentée, la restriction inhérente au système reste constante et on a beaucoup moins souvent besoin d'en faire l'inspection.

TUBERIAS DE GASOLINA

De un comienzo muy pequeño, las tuberías conductoras de gasolina se han desarrollado hasta representar hoy día grandes sistemas de transporte no sólo para gasolina, sino también para otros productos refinados, entre las refinerías centrales y los puntos de consumo.

Los ingenieros han venido estudiando los problemas relacionados con las tuberías de gasolina, los cuales se diferencian, en muchos detalles, de los relativos a las tuberías de aceite. Gracias al intercambio de información, han logrado establecer muchas prácticas normales muy útiles en la construcción de tubería para la transmisión de productos refinados.

FILTRACION DEL AIRE

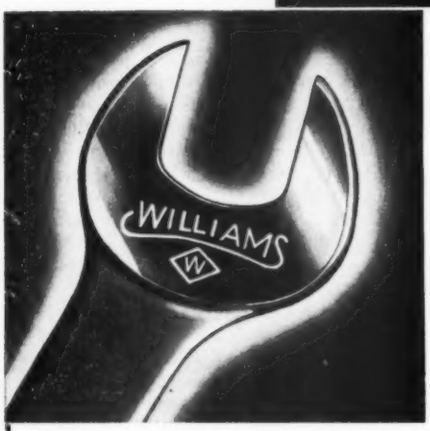
La frecuencia de las tempestades de polvo ha inducido a los explotadores a darse cuenta de la necesidad y de la economía de la filtración del aire empleado en los motores de combustión interna y en los compresores. Para librar el aire ordinario de las diversas substancias extrañas, que lo contaminan, los depuradores de aire resultan esenciales a los grupos de motores y compresores bien equipados, traduciéndose su empleo en mayores rendimientos y en una explotación más económica.

Aunque es muy esencial la filtración de gran efectividad, ella debe, sin embargo, combinarse con el tipo de equipo, para evitar la obturación del elemento filtrante, lo mismo que para evitar el aumento en consumo de combustible y la necesidad de frecuente limpieza. Los filtros de aceite, para compresores y motores, se dividen en dos tipos: el tipo de humedecimiento por aceite y el tipo de baño de aceite.

Los tipos de humedecimiento por aceite se ofrecen en forma de panel o circular. El elemento se sumerge en aceite, antes de la limpieza y antes de ponerlo en servicio. El aceite sirve para inducir la adherencia del polvo, y a continuación, la atracción natural del polvo por el polvo, se encarga de continuar el procedimiento de depuración. Los filtros de humedecimiento por aceite se distinguen por tres características principales: eficiacia de la filtración, restricción mínima y un prolongado servicio antes de necesitar limpieza.

Los filtros del tipo de baño de aceite incorporan una cierta cantidad de aceite llevada al elemento filtrante por la velocidad del aire, lo que lava automáticamente el elemento del polvo recogido, depositando este polvo en el recipiento de aceite. El aire es primeramente sometido a una depuración, al pasar por el aceite agitado. La eficacia general del tipo de baño de aceite es superior restricción inherente del sistema permanece constante y hay mucho menos necesidad de frecuentes inspecciones.

PUT THESE PROVEN TOOLS..



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WILLIAMS' "SUPERRENCHES"

Drop-forged from Chrome-Molybdenum steel. Thin heads, narrow jaws and extreme strength. Made in all popular patterns in Open-end and Twelve-point box types. Heat-treated, chrome-plated with heads buffed bright. Complete opening range for U. S. standards; many Whitworth Standard and Metric sizes.

CLES DE QUALITE WILLIAMS

Forgées à la presse à partir d'acier au chrome-molybdène. Têtes minces, mâchoires étroites et robustesse extrême. Prévues de tous modèles populaires en types d'extrémité ouverte et types fermés à douze points. Traitées thermiquement et chromées avec têtes à poli brillant. Gamme complète d'ouvertures pour standards U.S.; de nombreuses tailles métriques et standard Whitworth.

LLAVES WILLIAMS' "SUPERRENCHES"

Se forjan a martinete, de aleación de acero al cromo y molibedeno. Cabezas delgadas mandibulas angostas y firmeza extrema. Se hacen en todos los modelos populares, en tipos de boca abierta y en tipos cerrados de 12 puntos. Se tratan térmicamente. Llevan enchape de cromo, con cabezas brillantemente pulimentadas. Surtido completo de admisiones para dimensiones normales U. S., incluyendo algunos tamaños normales Whitworth y métricos.

"VULCAN SUPERIOR" CHAIN PIPE VISE

With handle on top for convenience and jaws reversible for wear. Williams' "Vulcan Superior" provides an inflexible, unbreakable grip. Takes pipe half inch larger than corresponding size in other vises. Two sizes, for pipe ⅛" to 4½" Like all Williams' tools, they are fully guaranteed.

ETAU A CHAINE POUR TUYAUX "VULCAN SUPERIOR"

Avec manivelle placée en haut pour la commodité et des mâchoires réversibles pour l'usure. L'étau "Vulcan Superior" Williams assure un serrage inflexible et inébranlable. Il permet de recevoir des tuyaux d'un demi pouce de plus en calibre que ne le peuvent les étaux courants de même taille. Deux tailles, pour tuyau de ⅛ de pouce à 4½ pouces. Comme tous les outils Williams, ils sont garantis sans réserve.

TORNILLO DE CADENA PARA TUBOS "VULCAN SUPERIOR"

Con manivela colocada en punto superior, para mayor conveniencia, y con mandíbulas reversibles, para compensar el desgaste. El tornillo "Vulcan Superior" asegura una sujeción inflexible tenaz. Admite tubos de una media pulgada más de diámetro en comparación con otros tornillos de igual tamaño. Hay dos tamaños, para tubos de 1/8 a 4-1/2 pulgadas. Como todas las herramientas Williams, estos tornillos se garantizan incondicionalmente.

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75 Spring St., NEW YORK

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WILLIAMS
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Clean out with a MILLER

Nettoyez au moyen d'une MILLER

Limpie con la ayuda de una MILLER

IN ANY LANGUAGE *means— increased production!*

SPEED WITH CERTAINTY

For years MILLER Sand Pumps have been used by companies large and small in oil fields in every part of the world. The enormous suction created by the plunger action enables it to pick up a load greater than any other bailer. The wire line connection with the plunger permits the use of a longer tube.

Depuis des années, les pompes à sable MILLER sont employées par les compagnies pétrolières, petites et grandes, dans les champs de pétrole du monde entier. La succion énorme créée par l'action du plongeur permet à cette pompe d'extraire une charge plus grande que celle extrayable avec tout autre écopeur. Le raccord du câble métallique avec le plongeur permet l'emploi d'un plus long tube.

Desde hace años, las bombas de arena MILLER se han empleado por compañías petroleras grandes y pequeñas, en todas partes del mundo. La aspiración enorme creada por la acción del émbolo permite a esta bomba extraer una carga más grande que la que puede ser extraida por cualquier otra bomba de su clase. La conección del cable metálico con el émbolo facilita el empleo de un tubo más largo.

SAND BOTTOM
Used when tools are run and when well is shot to quickly remove loose material.

STAR BOTTOM
Used for cutting the sand loose.

BAILER BOTTOM
With the Bailer Bottom installed the Miller is changed to a Bailer, giving you a combination of either a Bailer or Sand Pump in one tool.

CHISEL BOTTOM
(In Pump)
Will often save the expense of running tools, as its chisel shape breaks up tightly-packed sands.

The MILLER is made in diameters of 2½, 3, 3½, 4, 4¼, 5, 5½, 7 and 9 inches and lengths of 20, 25 and 30 feet. Nine gauge seamless tubes used in Regular type Sand Pump. One quarter inch wall tubes furnished when extra Heavy Sand Pumps are desired.

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No. 2055667

PROBLEMS FROM READERS

Edited by L. G. E. Bignell

Can a 6,000-Foot Well Be Produced Successfully by Gas-Lift?

We have a well 6,000 feet in depth that will make 700 bbls. of oil per day. Having heard considerable discussion as to the possibilities of lifting oil from this depth with gas-lift, we would appreciate your advising us the cost per barrel for lifting oil in this manner, also the cost that would be required for the equipment necessary to employ with this method.—E. G.

Your inquiry does not state the various conditions necessary to know before a complete answer can be given. It would be necessary to know whether the well is in a new field and whether the production stated is the initial, the potential, or the allowable. Other pertinent factors are the reservoir pressure, thickness of sand, quantity of formation gas, size of casing, whether the sand is tight or porous, and whether the oil is found in sand or in a limestone formation. All of these factors enter into the matter of a choice of method for lifting the oil.

We might first assume the conditions that would make it inadvisable at this time to use the gas-lift. If the formation is a porous lime formation and the gas is heavily impregnated with hydrogen sulfide, it would probably not pay to build a plant to lift this oil by gas-lift, since the corrosive effect on casing, tubing, and other equipment would make the operation costly, especially after water encroachment has begun. Until water has found its way into the well, it would probably be advisable to buy gas, if this is obtainable at a reasonable price, until the well declines to the capacity of the sucker-rod pump, which would ordinarily be in the neighborhood of 200 to 300 bbls. of fluid per day.

If the casing is small, that is, 7-inch O.D. or smaller, it would not be advisable to incur a heavy capital outlay for gas-lift equipment for a single well, because of the high consumption of gas per barrel when employing this size of casing in the latter stages of the operation. It would probably be advisable to place such a single well on the sucker-rod pump after natural flow ceases. Exception might be made in the case of a tight sand, when using a casing of 6⅝-inch or 7-inch, and when there is a fairly high reservoir pressure, say, above 200 pounds flowing pressure, in which case the plunger-lift form of gas-lift could be installed. The equipment required after natural flow ceases would not be excessive, operating costs would be low, and down-time would be almost negligible.

Wells of 700 bbls. per day at depth of 6,000 feet are usually two or three years old, coming in originally for 2,000 to 10,000 bbls. per day. If this is a new well capable of making, say, 2,000 bbls. per day, restricted to 700 bbls. per day, the conditions affecting the size of the plant required, and the operating costs would be considerably different from the case when the well has actually declined to a maximum production of 700 bbls. per day. In case the sand is fairly thick, 25 feet or more of productive formation, and is quite permeable such as the usual Wilcox sand, it would probably be a paying investment to build a compressor plant to handle this well on gas-lift. A plant of the size sufficient to operate this well would cost $25,000 to $40,000, depending on the type of plant installed. If the well were capable of making 2,000 bbls. per day, the gas required would probably be about 1,500 feet per barrel. Such a well would probably be operated at the rate of 1,500 to 2,000 bbls. per day, eight hours in the day, to make the allowable of 700 bbls. per day. The plant would be closed down for the remaining 16 hours, unless some revenue could be derived from operating other wells in the vicinity. Operating costs would be about 2½ cents per 1,000 feet of gas, and the lifting cost for gas would be about 4 cents per barrel, on basis of 1,500 feet per barrel. As the well declines, the consumption of gas per barrel will gradually increase, but this plant would always be capable of handling the maximum production that the well could make. The operating cost would increase, however, due to the necessity of operating the plant for a longer portion of the 24 hours. Such a plant has been known to pay out the outlay for the plant by the sale of compressed gas to neighboring wells, during the first year or two of its life.

Plant of the size recommended would be required to handle the production of one well at maximum capacity, but for a considerable period of time, while production was restricted, the plant would be capable of handling the allowable production from three wells.

Does the Term "Anhydrite" Give Any Indication of Geological Age?

In a report on a well drilling in England it is stated "the well is drilling in 'anhydrite'" Does this indicate the age of the formation or can it be used for correlation of the strata with some strata in this country?—M. J.

No.

In the late Dr. J. A. Udden's handbook "Aids to Identification of Geological Formations" gypsum and anhydrite are described as:

"Any large accumulation or bed of these minerals is to be regarded as rock and should be identified by drillers in describing the ground explored.

"When sulfate of lime is precipitated in the sea, it may result in the formation of either of these two rocks. Both are characterized by their softness. They can be scratched with the finger nail. Neither of the two is attacked by acid, and this furnishes a ready method for identification. A soft sedimentary rock which resembles limestone in texture and which will not effervesce in acid, is in nine cases out of ten either gypsum or anhydrite. Anhydrite may sometimes be known from its behavior in drilling. When it is ground up into very fine powder by the drill, it is apt to take up water and set like plaster of paris, adhering strongly to the bit, even to such an extent as to intefere with the work. Anhydrite as well as gypsum occurs in association with the salt domes in the Gulf coast country and there they are, like the salt deposits, limited in horizontal extent but often quite deep. Usually the anhydrite occurs under the cap rock and always above the salt. It has frequently been reported as limestone by drillers in the coastal fields. While small crystals and small bodies of gypsum and anhydrite may be found in many clays, it is only in the Permian and perhaps some of the Comanchean beds in the western part of the state that these minerals exist as extensive formations. Most of the sulfate of lime in the Permian sea seems to have been deposited originally in the form of anhydrite, for it is seldom that any gypsum exists in these beds below 300 or 400 feet, from the surface. Below this depth nearly all sulfate of lime is anhydrite. Extensive beds of anhydrite underlie the Panhandle and the Llano Estacado and extend nearly to the central part of the state of Texas in the lower part of the Permian. Anhydrite as well as gypsum has frequently been reported as limestone. The most fine-grained kinds of gypsum and anhydrite are also called alabaster rock.

The above all applies to gypsum and anhydrite in general and to conditions as found in Texas. The southern part of England, where the well in question is being drilled, is really a part of an old basin which extended south to a position below the present site of Paris, France. This basin was occupied at various times by ancient seas and in the manner described by Dr. Udden the material identified as anhydrite in the report was laid down.

Will Hole Drilled Below Sand Into Shale Contain Fractures?

We have drilled our wells in Wilson County, Kansas, through the sand and formed a pocket of from 10 to 20 feet in blue shale below. I have been advised this shale below the sand may have crevices and cause a serious drainage from the oil sand. No doubt there are facts and not guess work covering such a situation?—J. P. C.

There are thousands of wells in northeastern Oklahoma and southeastern Kansas with holes drilled below the sand into the dry shale beneath and we have never heard of any leaking oil. It is of course possible for a crevice to develop in a shale but under an overburden of from 500 to 1,200 feet it is hardly probable any such crevice would remain open long.

The best evidence to support this statement may be found in the work of Frederick G. Clapp, on "Water-Flooding Pressures at Bradford, Pa." published in the A.A.P.G. Bulletin No. 6, Vol. 19, June 1935. Mr. Clapp made this study to determine what thickness of overburden would safely resist movement under water pressure from below during water-flooding operations in Bradford, Pa. He found that overburden less than 720 feet would not be self supporting and would tend to sink if material beneath it was withdrawn.

For comparison between the shale of Kansas and other rock listed by Mr. Clapp the characteristics of shale from Pen Argyl, Pa., is nearest and it has a compressive strength of 9,940 pounds per square inch and a shearing strength of 3,550 pounds per square inch. It is assumed the Kansas shale when laid down did not contain fractures because if it had there would probably be water in it now or perhaps oil would have escaped downward from the sand and would be noted when the sump hole was drilled into the shale.

It therefore follows that if the shale has a compression strength of about 10,000 pounds and a shearing strength of 3,500 pounds per square inch, a mass of rock 800 feet thick with an average gravity of 2.62 resting upon the shale would exert a pressure of less than 1,000 pounds per square inch. This would seem to indicate there is not enough overburden on the shale to fracture it and if some mass movement had occurred below the shale the 800-foot mass of rock above it would not be self supporting and therefore the whole mass would sink and any fissures in the shale would probably be closed by pressure.

To summarize there is not sufficient weight above the shale to fracture it. The mass above the shale is not thick enough to be self supporting and if movement occurred below the shale the tendency would be for the material above the shale to sink and this should close any fissures within the shale. If fissures have actually been noted in the shale they were probably of very local character.

It is possible the formation immediately beneath the producing sand is not shale. This phase of the problem should be investigated before concluding shale is the offending member.

QUESTIONS ON TECHNOLOGY

By Charles K. Francis, Ph.D., Technical Editor

Petroleum Oils Suitable for Use as Insecticidal Sprays

We desire information covering the type of oils suitable for use as agricultural sprays, especially the usual tests that should be used for the quality of such oils.—L. A. H.

The California Department of Agriculture has made extended investigations of spray oils for the protection of citrus trees and has recommended five grades of petroleum oils. These are classified according to the percentage distilling off at 636° F. (1) Light 65-100; (2) light medium 60-64; (3) medium 40-49; (4) heavy medium 30-39; (5) heavy 0-29 per cent.

An additional specification is unsulfonated residue, an indication of the injurious aromatic and unsaturated hydrocarbons, which shall be a minimum of 90 per cent for the lighter oils, 92 per cent for the intermediate grades, and 94 per cent for the heavy oils. The unsulfonated residue is the oil separating at 100° C. when treated with sculfuric acid and centrifuged in a Babcock cream bottle.

The sprays are known as tank mix, soluble oil and emulsion. The tank mix is prepared by adding 1 to 2 per cent oil to water, then adding a mixture of 25 per cent blood albumin and 75 per cent bentonite. Soluble oil contains an emulsifier. Emulsions may contain 15 per cent water in addition to a spreader and emulsifier.

Reference: C. Z. Webb, The Oil and Gas Journal, Feb. 6, 1936, page 30.

Commercial Synthetic Process for Lubricating Oil Not Available

We have synthetic methods for making gasoline such as cracking, polymerization and hydrogenation. Are any similar processes available for making lubricating oils?—E. C. A.

The literature does not reveal any commercial processes now in use for the synthetic preparation of lubricating oils. Dr. A. R. Bowen reviewed this subject in some detail several years ago and the brief discussion following is based on his articles.

The progress made in the conversion of heavy oils, coal products including tars and other bituminous substances has encouraged efforts to produce synthetic lubricating oils. Heavy viscous oils of synthetic origin have been reported but certain of their chemical properties would prohibit their use as practical lubricants.

Fractions from low temperature tars have perhaps been the chief source of misapprehension in this connection. The whole subject of the composition of low temperature tars is complex, as the constituents depend on the nature of the coal from whence the tar was obtained, and upon the temperature and distillation conditions. Fractions of tar with similarity to petroleum fractions are obtained from the low temperature carbonization oils from oil shales and cannel coals, while brown coal low temperature tar appears to stand somewhere between the shale oils and low temperature bituminous coal tars, in properties.

The oils investigated by Bowen were obtained on laboratory or semicommercial plant scale from (1) low grade petroleum lubricating oils—by catalytic hydrogenation. (2) Coal—by (a) low temperature carbonization, (b) hydrogenation of coal and coal tar, (c) catalytic hydrogenation. (3) Ethylene and other olefins—by (a) polymerization, (b) condensation with middle oils.

The tendency to demand high grade lubricants must naturally be reflected upon these suggested processes for synthetic oils so only those which produce very high oils can expect to receive any consideration.

All the processes described appear to be some way yet from commercial development except perhaps the catalytic hydrogenation of inferior petroleum lubricants.

The synthetic oils from coal contain different constituents than petroleum lubricating oils. The same applies to the polymerized olefine products, and more research is needed to determine the effect on the products of modifications in the processes already described. The condensation of ethylene with middle oils is indeed a line of research well worth investigating.

This research is hampered by lack of knowledge of the chemistry of the high molecular weight nonbenzenoid hydrocarbons. However, some useful information can readily be obtained by a study of the effect of various solvents on these different classes of synthetic oils, side by side with experiments on natural petroleum oils. Liquid sulfur dioxide, for example, divides a normal petroleum lubricating oil into an extract of more viscous nature, with greater unsaturation and of steeper temperature/viscosity curve than the original oil, and a nonsoluble oil of lighter viscosity and of greater stability and uniformity of properties.

References: A. R. Bowen, The Oil and Gas Journal, March 5, 1931, page 209. A. W. Nash, et al, J. Inst. Petrol. Tech., 16, 830, 1930.

Questions on Petroleum Technology may be sent to Dr. Charles K. Francis, The Oil and Gas Journal, Tulsa, Okla. When a copy of the answer is desired postage should be enclosed.

SPECIFICATIONS

COMPOUNDED STEAM-CYLINDER OIL

This oil shall be of three grades, consisting of refined mineral oil compounded with a fatty oil (tallow or lard) suitable for lubrication of steam cylinders of noncondensing engines and pumps.

REQUIREMENTS

	Limits		
	Grade (1)	Grade (2)	Grade (3)
Visc. S.U. at 210° F.	95-110	120-150	180-220
Pour °F. max.	40	60	60
Flash °F. min.	450	475	520
Precp'n. No. max.	0.05	0.05	0.05
Carb. resid. % max.	2.00	2.50	4.00
Reaction	Neut.	Neut.	Neut.
Neut'z'n. No. max.	1.00	1.00	1.00
Corrosion	nil.	nil.	nil.
Water %	nil.	nil.	nil.
Fatty oil %	9-10	5-7	5-7

Grade 1 is intended for use with saturated steam at pressures less than 90 pounds per square inch; grade 2 at steam pressures from 90 to 175 pounds; and grade 3 at pressures in excess of 175 pounds and with superheated steam at all pressures.

Reference: Federal Standard Stock Catalog, Sec. IV, VV-0-601.

Determination of Gum in Gasoline by Copper Dish Method

If available kindly furnish us with the test procedure used by the industry for the determination of gum in gasoline by the copper and also the porcelain dish method.—E. C. F.

The determination of gum in gasoline by the copper dish method is a method of the Federal Specifications Committee. Some refiners prefer to substitute a porcelain dish but otherwise follow the directions given for the copper dish test.

The details of the Federal Copper Dish Test were developed by the Atlantic Refining Co.; the brief outline given here is based on the method as described in the Federal Standard Stock Catalog.

METHOD FOR GUM CONTENT IN GASOLINE

Apparatus:

Copper dish—Spun copper, hemispherical, 3½ in. diam., 1½ in. deep, capacity 150-160 ml.

Steam bath—A special type with 3⅜-in. openings for dishes, set in a hood, supplied with air vent pipes, through which air is delivered to cause a uniform swirl about the dishes.

Electric oven for 100°-110° C.

Analytical balance.

PROCEDURE: The copper dish must be thoroughly cleaned, polished, wiped dry with a dry clean cloth and weighed. Exactly 100 ml. of gasoline shall be measured and then poured into the dish and set on the steam bath. The small quantity of venting steam shall be held between 99.5° to 100° C. Complete evaporation usually requires 2.5 to 3.5 hours. When no more volatile matter remains, the dish is removed, dried on the outside and placed in the electric oven at 100° to 105° C. until constant weight, which usually requires one-half to 1½ hours. Then the dish is placed in a desiccator, cooled and weighed. The increase in weight is reported as the copper-dish gum content of the sample in milligrams per 100 milliliters.

The details of the method may be found in the reference first mentioned.

References: Standard Stock Catalog, VV-L791a, page 99, Superintendent of Documents, Government Printing Office, Washington, D. C. (price 15 cents). U. S. Bureau of Mines, R. I. No. 3152, November, 1931.

Octane Value of Lighter Fractions Decreases With Gravity

I understand it is a generally recognized fact that the octane value of the lighter fractions from crude oil falls with each fraction taken off. Do you have an analysis showing this?—R. T.

The high gravity Rodessa oil, from northwestern Louisiana, has been thoroughly investigated by A. W. Trusty, as reported in The Oil and Gas Journal.

A pipe-line sample of the oil, gravity 46 A.P.I., was dark green in color with a Saybolt viscosity of 46 seconds at 100° F. and 60 at 50° F. The pourpoint was 0° F. flash below atmospheric temperature, sulfur 0.20 per cent and sediment and water 0.3 per cent. Fractions of 5 per cent each, down to 40 per cent were distilled from this oil and examined.

The data are given in the table.

FRACTIONS FROM RODESSA OIL

Percentage off	Gravity	Endpoint	Octane Number
5	81.4	253	69
10	77.3	264	64.2
15	73.7	280	59.5
20	72.0	288	56.5
25	67.4	299	52.0
30	66.7	324	49.0
35	65.3	346	45.5
40	63.4	376	41.0

Reference: A. W. Trusty, The Oil and Gas Journal, October 15, 1936, page 72.

American Oil Man Reports on U.S.S.R. Expansion

The oil industry in the U.S.S.R. has witnessed signal advances in the last five years and there is every reason to look for marked expansion in the years ahead, according to J. Garfield Buell, independent oil producer of Tulsa, who visited Russia during the summer. But, he said, soviet leaders in the oil and other industries, when discussing the nation's plans and expectations for the future, almost invariably add the ominous proviso, "if we don't get into a war."

Accompanying Mr. Buell were two other oil men, C. L. McMahon, of Tulsa, and Harry Stekoll, of Dallas, Tex.

Mr. Buell spent six weeks in the U.S.S.R. five years ago, and his second visit was prompted by a desire to compare present conditions with those he found on the first trip and by his lively interest in international developments. "No nation can live its own isolated life in these times," said Mr. Buell. "What the rest of the world is doing is bound to determine in a great measure what the United States will do. The Russian program, whatever you and I may think of it personally, may have a profound effect on our own economic future." As an oil man he was particularly interested in Russia's oil industry, he remarked.

"One of the things that impressed me," said Mr. Buell, "was the immense petroleum potentialities of the country. In the Baku district we saw wells miles from any other development and often not connected up. Much seismograph work has been done, we were told. And although we did not see any geophysical crews, it seemed evident there had been scientifically directed exploratory work, for the land is flat, with few if any surface indications of oil. There is to be a great deal of new drilling, engineers said, and also the redrilling of old wells. They are going to deeper and deeper levels. The deepest commercial production is coming from 9,100 feet, we were informed. In the original Baku field some 1,200 old wells are to be redrilled.

"Unquestionably Russian oil men have taken big strides since I was over there before. Petroleum engineers from the United States were on the ground then, showing the Russians how to do it. There are no foreigners now. Native Russians, who have received technical training in this country or who were taught by American engineers who formerly directed oil developments in Russia, are now supervising the work and teaching native students. Efficiency is still low, but that is largely because of what they have to work with in the way of equipment rather than because of inferior technical knowledge. And they are growing in efficiency steadily. Although there is no such system of highways as we have here, roads have been improved, and we had little difficulty in getting around the oil fields by motor car."

Notwithstanding prospective expansion of the oil industry in the U.S.S.R., Mr. Buell said he believed the country would become a diminishing factor in the world oil markets for the reason that the further industrialization would create an increasing demand for oil supplies at home. Russia's present daily production of crude is about 600,000 bbls., which is second only to that of the United States, and of this total some 420,000 bbls. comes from the Baku fields. An important development program is under way in the Ural Mountains, where daily production already is in the neighborhood of 40,000 bbls., chiefly from shallow wells.

"They have to import a good deal of their oil equipment," Mr. Buell said, "but most of what they need they make themselves, and even though it is not of top quality, they get along with it. We saw tubular goods and so on with which we were familiar, and it was not of the grade we get in this country, but it serves their purpose and the growing nationalistic spirit is more nearly satisfied than if they got something better from another country. Their highest efficiency in manufacture is said to be the tractor factory in Kharhov, where they turn out 150 tractors of good quality a day. We were permitted to go through this factory by special arrangement made in Moscow, a privilege said to be infrequently afforded travelers. The factory gives employment to 12,000 persons, 60 per cent of whom are men."

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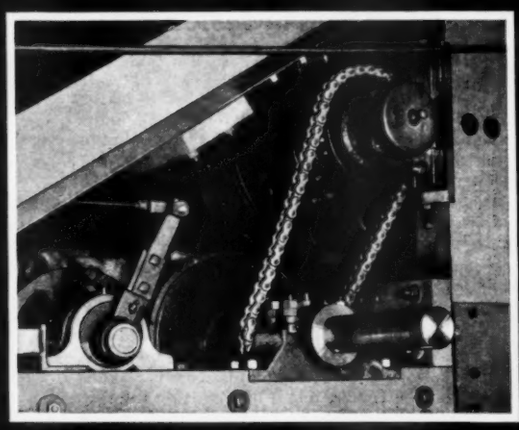

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FIELD GEOLOGY

By Dr. F. H. Lahee
Chief Geologist, Sun Oil Company

5 x 7½; 789 pages; 538 illustrations

From the review by L. G. E. Bignell, Petroleum Engineering Editor, The Oil and Gas Journal:

"Dr. Lahee is very well known to the oil industry, and is an advanced student of geology as applied to oil field problems. He has viewed those problems from both a scientific and economic angle, and his conclusions are well taken and should prove of value to all who have any interests in the future development of the petroleum industry. This third edition (1931) has special reference to several methods of scientific research in structural geology that were developed since the previous edition was published. This subject is treated in such a manner that much information is given in a limited space, and many questions asked by the layman, as well as the experienced geologist, are answered."

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THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

FIELD OPERATIONS

Summarizing the Week's Developments

The Christmas season, as always, influenced field work, the result being a decline of 169 completions in the past week, compared with the previous seven days.

Gulf Coastal Texas added an important pool in Polk County with a well starting at 511 bbls. of 40.4 gravity oil on a fractional-inch choke. In Southwest Texas, a new oil field in the Live Oak gas area was assured when a test blew out and ran wild and later was completed for 50 bbls. a day and 7,000,000 feet of gas. Sand extensions and a new pay were also features in that area. The West Texas district saw 40 new locations staked and the largest well yet found in the Tubbs or Sand Hills area, Ector County, good for 1,589 bbls. in six hours. Five new wells were added to the Talco and two to the Sulphur Bluff pools in northeastern Texas. East Texas experienced the quietest week in the year with only 20 new oil wells. The Texas Panhandle completed a substantial number of good-sized oil wells in four of the five producing counties, while the natural gas area showed gassers ranging from 8,000,000 feet up to nearly 51,000,000 feet in initial production.

LOUISIANA-TEXAS

The big news of the week in Louisiana came from the Gulf Coast where Miocene sand in a test 2 miles north of the Bosco field in St. Landry Parish showed 160 bbls. daily production, but was not yet completed. Prospects of a pool were also indicated on the Valentine Salt dome in Lafourche Parish. The Caddo Parish portion of the Rodessa field is being overshadowed by the newer Cass County portion of the pool which is drilling the most wells and supplying the bulk of the completions.

KANSAS

A 58-gravity oil well in the Graber pool, McPherson County, Kansas, though a small producer, was an unusual feature in that state. An 11,000-bbl. well in the Hiss pool in Barton County was a more substantial feature. The Silica field in Barton and Rice counties shows a new 3,000-bbl. well. South of the Wenke pool in Rice County a new Siliceous lime pool was opened, the discovery well filling with oil. It has not been tested.

OKLAHOMA

The Billings pool, Noble County, Oklahoma, was extended one-fourth mile southwest with a 2,252-bbl. Wilcox sand well. The Olympic pool, Okfuskee County, was extended nearly one-half mile north, and the Hunton lime zone in the Fitts field, Pontotoc County, was extended one-half mile northeast. None of the wells was officially completed. Several Edmond wells were near completion.

CALIFORNIA

A new pool was opened in the Rio Bravo district in Kern County, California, 7 miles north of the Ten Section field. These two constituted the only pool discoveries in the state in 1936. The new discovery well flowed 2,750 bbls. of 37.1 gravity crude in 24 hours, along with 7,000,000 feet of gas. Total depth of the well was 7,807 feet.

ROCKY MOUNTAIN AREA

A pool was opened on the Mosser dome in Yellowstone County, Montana. A 400-bbl. well was completed on the Garland dome in Wyoming. An important test in Goshen County, southeastern Wyoming, struck granite at 3,052 feet and was abandoned. Important sections were missing in this test. The well was located after a seismograph survey and it is possible the reflections indicating a structure were on the granite instead of sedimentary rocks. Lea County, New Mexico, reported routine completions.

Completions in All Fields

(Week Ending December 26, 1936)

	Oil	Gas	Dry	Total	1936 total comp. to date	1935 total comp. to date
Penna. Grade Fields	35	15	13	63	3,391	3,047
Lima Field	0	0	0	0	80	94
Central Ohio	2	4	3	9	451	311
Indiana	3	0	3	6	185	197
Illinois	0	0	0	0	27	11
Michigan	5	3	2	10	665	593
Kentucky	3	0	2	5	291	253
Kansas	31	1	9	41	1,686	1,210
Oklahoma	34	1	12	47	2,431	2,010
North Central Texas	20	0	11	31	2,450	2,585
West Texas	17	0	2	19	1,578	830
Texas Panhandle	5	0	0	5	644	706
East Central Texas	7	0	2	9	407	251
East Texas	20	0	3	23	2,425	4,166
East Texas border	6	0	0	6	160	12
Gulf Coast Texas	9	0	3	12	1,169	1,074
Southwest Texas	22	1	6	29	2,915	1,611
Total Texas	106	1	27	134	11,748	11,235
North Louisiana	3	1	1	5	612	343
Gulf Coast Louisiana	3	0	0	3	364	354
Total Louisiana	6	1	1	8	976	697
Arkansas	3	0	0	3	88	115
Montana	2	1	0	3	236	186
Wyoming	1	0	1	2	115	92
Colorado	0	0	0	0	28	18
New Mexico	11	1	0	12	583	337
Utah	0	0	0	0	7	5
California	11	0	7	18	1,220	1,110
Total United States	253	28	80	361	24,208	21,521
Total previous week	356	49	125	530		
Difference	103	21	45	169		

Outstanding Fields—Highlights

(Week Ending December 26, 1936)

FIELD—	Rigs up	Wells drlg.	Weekly oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS						
Anahuac	4	6	1	280	133	9,215
Hastings	3	7	2	1,080	120	8,257
Loma Novia	6	2	5	1,495	631	15,120
Seven Sisters	5	3	5	2,945	345	8,140
Saxet Heights	5	4	2	400	195	8,990
Saxet	9	29	4	520	297	21,900
Lopez	4	4	4	1,370	254	6,110
East Texas	49	105	20	821	21,906	450,911
Talco	21	21	5	909	152	15,040
OKLAHOMA						
Oklahoma City	6	13	3	3,384	1,087	161,325
Fitts	7	70	4	1,787	562	69,450
Burbank-So. Burbank	0	7	1	175	2,160	23,175
KANSAS						
Ellis County	3	12	1	356	72	3,610
Reno County	10	18	1	1,364	353	17,100
Russell County	7	46	2	2,876	538	20,965
Rice County	6	38	8	8,558	652	44,315
NEW MEXICO						
Lea County	3	94	10	2,223	521	78,710
LOUISIANA-TEXAS						
Rodessa, La.	5	15	1	384	334	58,690
Rodessa, Tex.	6	52	6	2,629	142	27,715
Gillis, La.	3	4	1	420	55	17,550
Tepetate, La.	2	4	1	216	38	6,597
MICHIGAN						
Porter-Yost	7	5	1	590	422	13,990
Crystal-Montcalm	5	6	1	200	147	3,100

California Field Report

By
L. P. STOCKMAN

NEW FIELD IN KERN COUNTY MAY HAVE LARGE POTENTIAL

LOS ANGELES, Dec. 28.—Standard Oil Co. celebrated Christmas season by discovering a new oil field in the Rio Bravo-Rosedale district of Kern County and indications point to the probable existence of a substantial accumulation of oil and gas. This is the second oil field discovered in California this year, Shell Oil Co. having previously discovered the Ten Section field. Standard's new field, which will probably be designated as either the Rio Bravo or Rosedale, is located 7 miles due north of the Ten Section field. A map showing the relative location of the Elk Hills, Fruitvale, Ten Section and Rosedale oil fields and the Semi-Tropic and Buttonwillow gas fields appeared on page 82 of the December 17, 1936, issue of The Oil and Gas Journal. Discovery of substantial production in the Rio Bravo-Rosedale district of Kern County is of paramount importance because it indicates the probable existence of two parallel lines of folding extending southeast from the Buttonwillow and Semi-Tropic gas fields. The Ten Section field appears to be located on the Buttonwillow sheer zone, whereas the Rosedale field is located along a line of sheering extending southeastwurd from the Semi-Tropic gas field. If this theoretical hypothesis is correct, we may anticipate the discovery of several additional prolific fields between Buttonwillow and the Ten Section field and between the Semi-Tropic gas field and the new oil field discovered by Standard Oil Co. in the Rio Bravo-Rosedale area.

Standard's discovery well in the Rosedale field is No. 11-1 Kern County Land, located in section 19-29-26. The well was located as a result of an extensive geophysical survey. It was brought in flowing 2,750 bbls. of 37.1 gravity oil and 2,000,000 feet of gas per day from 7,807 feet. The hole was finished with a 9⅝-inch water string landed at 7,440 feet, 105 feet of 7-inch liner including 54 feet of 80-mesh screen and 7,805 feet of 3-inch tubing. Late reports indicate that production of the well is showing a consistent increase and may ultimately reach 4,000 bbls. per day. It was brought in flowing through an 82/64-inch bean and is showing a pressure of approximately 1,000 pounds on the casing and 700 pounds on the tubing. Standard No. 11-1 K. C.L. is located 330 feet south and 330 feet west of the NE cor. section 19-29-26.

January Allowable

California oil producers will be expected to hold the state's crude oil production to 551,000 bbls. per day during January, 1937. This quota is the same as that prescribed for December, 1936, although actual production was considerably in excess of the allowable for December during the first 24 days of the month. The Central Committee of California Oil Producers, official curtailment committee, approved the allocation committee's recommendation that the crude oil quota for January remain the same as during December despite a recommendation of the U. S. Bureau of Mines that the January allowable be stepped up to 559,900 bbls. per day. When approving the January allowable, Chairman Lawrence Vander Leck warned operators that they must reduce production to a substantial extent during the remainder of the year if the December quota was to be met. The California report of the American Petroleum Institute revealed a decrease in all commodities with the exception of heavy crude during the month of November and preliminary estimates indicate a further reduction of stocks during December. There has been very little rain in California during the current year to date and the warm weather has stimulated the consumption of gasoline and lubricating oil. During January and February, consumption of gasoline can normally be expected to decline due to inclement weather and consequently it will be necessary for crude oil producers to keep production under restraint in order to prepare the groundwork for substantially improved conditions for the forthcoming year.

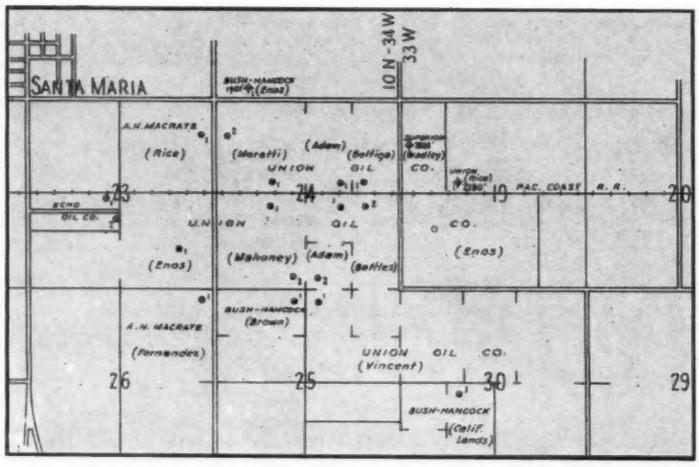
The California oil industry with few exceptions is looking forward to 1937 as a period of tranquility and with high hopes that the year will bring with it prosperity to producers, refiners and marketers. There appears to be some basis for this optimistic outlook because of the recent favorable decision of the U. S. Supreme Court on the California and Illinois fair trade acts and the absence of any prolific fields containing town lot areas. The Ten Section field, discovered by Shell Oil Co., and the Rosedale field, discovered by Standard Oil Co., do not present any threat to the curtailment program as all potentially productive acreage in these fields is held in large blocks by operators who recognize the advisability of restricting production to approximate current demand. Due to the large holdings of Shell and Standard in these two fields, it is thought that Shell controls all of the potentially productive acreage in the Ten Section field and that the Standard Oil Co. controls all of the possibly productive acreage in the Rosedale field. Future production of crude oil in the Santa Maria Valley field discovered by Union Oil Co. cannot be prognosticated with any degree of accuracy as far as 1937 is concerned. Union Oil Co. will very probably lay a pipe line into this area early in the new year. Up to the present, crude oil production has been moved by tank-wagon and the output of the field has been restricted to a small part of the field's potential. Lease requirements call for the drilling of numerous wells next year and this program will necessitate a pipe line outlet before the summer of 1937.

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	December 13		December 6			
Intercoastal-domestic:	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Diesel and gas oil	.....	.....	.....	.....	231,426	792,916
Gasoline	.....	.....	.....	.....	5,493,496	6,940,060
Kerosene	.....	.....	.....	.....	1,128,379	911,502
Foreign exports:						
Crude oil	.....	.....	124,987	17,855	8,793,352	12,307,836
Fuel oil	197,559	28,223	292,628	41,804	10,297,092	11,951,545
Diesel and gas oil	5,110	730	26,218	3,745	5,512,690	4,406,993
Gasoline	70,358	10,051	69,635	9,948	7,518,718	6,526,883
Kerosene	3,947	564	10,011	1,430	1,461,329	1,209,705
Asphalt	.....	.....	.....	.....	.....	5,758
Other unfinished oil	.....	.....	.....	.....	214,212	140,384
Coastwise-domestic:						
Crude oil	433,994	61,999	64,339	9,191	7,551,089	6,699,583
Fuel oil	85,116	12,159	209,823	29,975	10,413,501	8,884,478
Diesel and gas oil	7,078	1,011	15,725	2,246	1,111,825	1,130,798
Gasoline	88,892	12,699	456,272	65,182	12,440,357	11,183,836
Kerosene	5,525	789	.....	.....	169,062	177,452

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic:						
Diesel and gas oil	.....	.....	.....	.....	218,603	158,152
Gasoline	.....	.....	.....	.....	285,959	.....
Kerosene	.....	.....	.....	.....	.....	149,715
Asphalt	.....	.....	.....	.....	327,418	484,597
Lubricants	.....	.....	.....	.....	47,560	60,320
Foreign exports:						
Crude oil	.....	.....	130,174	18,596	3,273,015	2,535,173
Fuel oil	19,632	2,805	15,734	2,248	2,390,295	2,149,090
Diesel and gas oil	.....	.....	76,400	10,914	1,926,328	920,354
Gasoline	.....	.....	.....	.....	3,682,566	2,768,092
Kerosene	.....	.....	1,223	175	615,546	638,344
Lubricants	.....	.....	2,198	314	364,565	204,732
Other unfinished oil	.....	.....	.....	.....	90,923	.....
Coastwise-domestic:						
Fuel oil	81,914	11,702	.....	.....	6,142,288	6,862,294
Diesel and gas oil	.....	.....	30,068	4,295	646,056	295,368
Gasoline	58,891	8,413	194,718	27,817	5,268,517	4,209,723
Kerosene	.....	.....	.....	.....	203,744	94,005

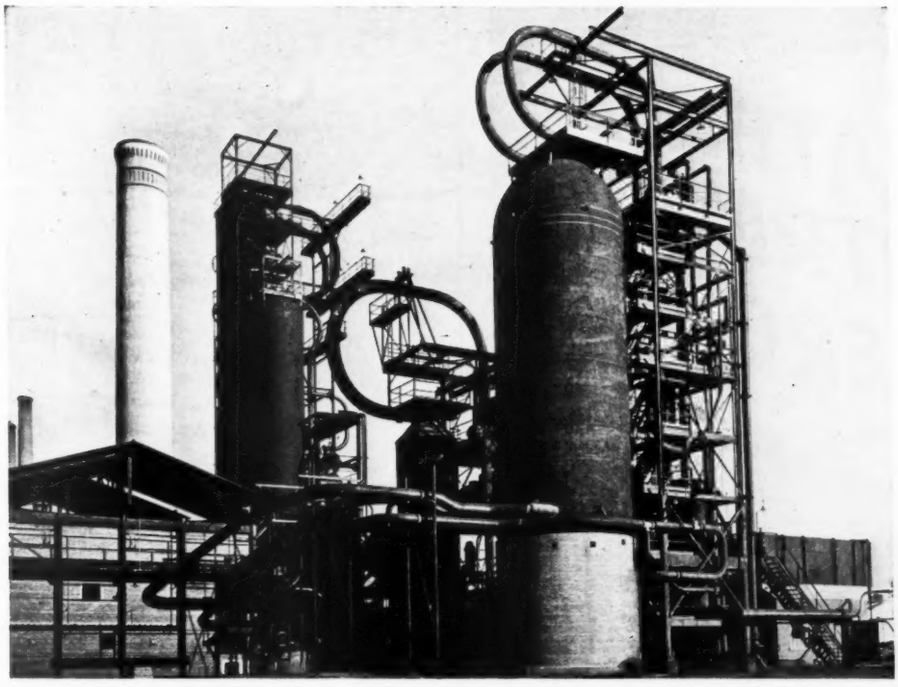


The Santa Maria Valley field is rapidly becoming one of the most active in California and work will show a further substantial gain as soon as pipe line facilities are made available

El Segundo

For almost a year the El Segundo field has been regarded as a district of secondary importance, but the recent completion of Richfield Oil Co. No. 1 El Segundo flowing a little better than 2,500 bbls. per day indicates that this field is of far greater importance than was originally believed. The limits of production are as yet undefined due to the limited amount of drilling undertaken up to the present time but it is not at all improbable that the El Segundo field will produce in excess of 20,000,000 bbls. of crude oil. A substantial part of this future production will be taken out within the next two years if drilling operations continue to increase at the rate maintained during the past two or three weeks.

Operators holding potentially productive acreage in the El Segundo field are not losing any time in starting the necessary amount of drilling to protect their leases from abnormal drainage. Republic Petroleum Co.,



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Type of unit	Number installed	Rated capacity Barrels per day
1. Atmospheric distillation—crude topping	59	467,800
2. Atmospheric distillation—crude to long. Residuum, flux or asphalt bottoms with lube oils overhead	27	99,300
3. Vacuum distillation—reduced crude	48	197,320
4. High vacuum and atmospheric treated dewaxed lube oil rerun	16	44,300
5. Low temperature cracked gasoline rerun	19	71,000
6. Crude oil stabilization	8	281,000
7. Natural gasoline plants	41	One of which processes more than 100,000,000 cu, ft. of gas per day.
Partial total	218	1,160,720

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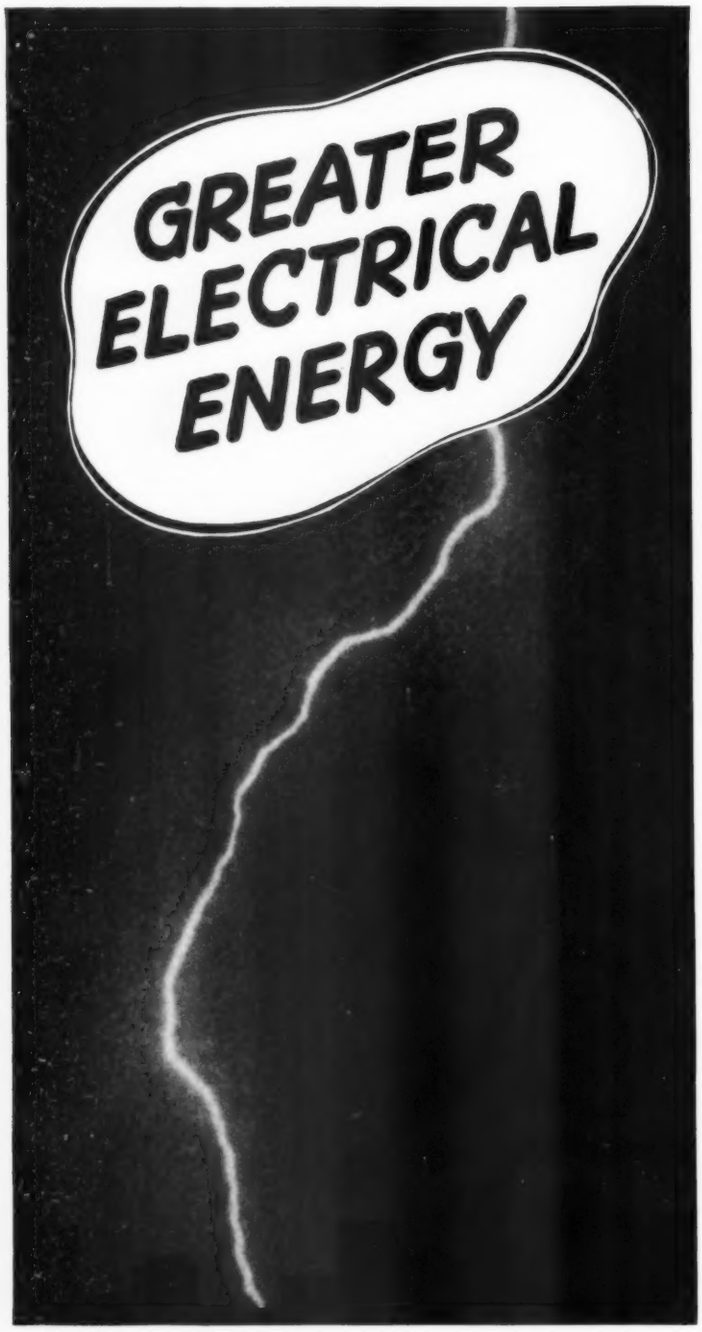

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discoverer of the field, has started rig construction for No. 3 El Segundo and has locations staked for Nos. 4 and 5. Richfield Oil Co. is building rig for Nos. 2 and 3 on the El Segundo lease. Texas Co. has started rig construction for No. 2-1 Johnson in section 17-3-14 and spud is scheduled to be made within the next 15 days. Caminol Oil Co. has rig material on ground for No. 1 El Segundo. Several other wells are expected to be started early in January and since the formation is conducive to fairly rapid footage we may anticipate the completion of several wells late in February or early in March.

It is a little too early to predict the future importance of the Wilmington district as far as crude oil production is concerned, as only one relatively large flowing well has been finished. General Petroleum Corp. No. 1 Patton, scheduled for completion within the next few days may throw considerable light on future production possibilities of the Wilmington district and General Petroleum No. 2 Terminal should verify findings of the company's first two wells within a short time. Production is secured in the Wilmington district at approximately 3,600 feet and this field can become a factor of considerable importance within a short time if the productive zone extends over several hundred acres. These relatively shallow wells can be drilled to completion within five or six weeks, and consequently production of the field depends upon the ability of the zone to produce and not the time required for drilling. The Ford Motor Co. has not yet awarded a lease on its assembly plant, located within a few hundred feet of General Petroleum Corp. No. 1 Terminal, but an early decision is anticipated. The Ford property is particularly susceptible to directional drilling and as a matter of fact the company securing a lease on this property must resort to directional drilling in order to bottom wells beneath the permanent buildings which occupy a large part of the acreage involved.

Mountain View

Hogan Petroleum Co. completed a new well in the Mountain View field of Kern County a few days ago when No. 2 Bankline-Symons in section 4-31-29 was brought in flowing 1,980 bbls. of 30.7 gravity oil and 1,200,000 feet of gas per day. The output of this new well, however, is showing a cut of 36 per cent and the company may ultimately reenter the hole and determine the effectiveness of the cement plug placed in the bottom of the hole just previous to completion. No. 2 Bankline-Symons was carried down to 6,095 feet but was plugged back to 5,965 feet due to the presence of a gray sand believed to contain water. The well has an 8⅝-inch water string landed and cemented at 5,148 feet and consequently the company can plug back the bottom of the hole still farther if necessary and yet have a sufficient thickness of oil sand to permit commercial production. Mohawk Petroleum Co. No. 3 Hood, a deep test being drilled in the Mountain View field, has passed the 8,000-foot level but has not yet picked up the new zone expected to be encountered above this point.

Two new wells and one recompletion were reported in the Midway-Sunset field of Kern County during the current week. Union Oil Co. No. 3 Williams in section 22-32-23 proved to be an excellent well upon completion at 1,850 feet and it tanked 492 bbls. of 17.4 gravity oil during the initial 24-hour test following completion. No. 3 Williams was brought in on the beam after the hole had been finished with an 8⅝-inch water string landed at 1,692 feet and a 6⅝-inch liner carrying 149 feet of perforated. Quality Oil Co. No. 3 W.P. in section 27-32-23 was returned to production pumping 358 bbls. of 16.2 gravity oil per day from 2,281 feet. Immediately upon recompletion of this well, the crew was transferred to No. 4 Bull in section 22-32-23 and the latter well is expected to be spudded in some time within the next few days. Birch-Branch Oil Co. No. 1 Goldman in section 22-32-23 proved somewhat of a disappointment upon completion as it was only good for 94 bbls. of 16.1 gravity oil per day on the beam. This new well was originally drilled to 2,142 feet but was subsequently plugged back to 2,099 feet and the hole finished with a 5-inch liner carrying 232 feet of perforated. Several additional wells are nearing completion in the Midway-Sunset field and present indications point to a continuance of drilling operations for several months to come.

Mount Poso

Texas Co. completed an excellent producer in the Mount Poso field of Kern County a few days ago when No. 11 Vedder in section 4-27-28 was brought in pumping 508 bbls. of 16.9 gravity oil daily from 1,833 feet. It was finished with an 11¾-inch water string landed at 1,733 feet and an 8⅝-inch liner including 109 feet of perforated. No. 2 Murdock of the Petroleum Securities Co. in section 34-27-28 registered an initial daily production of 63 bbls. of 16.4 gravity oil from 1,670 feet. In the Kern River field, E. B. Milburn No. 1 Kern in section 10-28-27 has been completed pumping 174 bbls. of 14.4 gravity oil per day from 2,210 feet after the hole had been plugged back from 2,230 feet and finished with a 6⅝-inch liner carrying 135 feet of perforated. In the North Belridge field of Kern County, Associated Oil Co. has recompleted No. 5 Reward flowing 1,870 bbls. of exceptionally clean 31.4 gravity oil and 640,000 feet of gas per day from 9,027 feet. This well blew in prematurely a week or so ago with drill pipe in the hole but it was subsequently killed in order to permit completion in the normal manner with a string of tubing in the hole. Belridge Oil Co., with three string of tools in operation in the North Belridge field, is putting the finishing touches on two new rigs.

In the Ten Section field of Kern County, Shell Oil Co. has started rig construction for No. 30 K.C.L., which will be drilled in section 30-30-26. This will be the fourth well started in this field by Shell since its discovery. Two wells have already been completed and a third, No. 34 K.C.L., in section 29-30-26, is nearing completion. Standard Oil Co. has abandoned No. 10-1 K.C.L., an outpost in the Ten Section field due to the unfavorable outlook at 8,900 feet, but is still drilling ahead in No. 9-1 K.C.L., another outpost located in section 34-30-26. Superior Oil Co. is expected to file an early abandonment notice on No. 8 K.C.L. north of production in

(Continued on Page 310)

The RATIGAN No. 115 ONE-PIECE FRAME TYPE OIL-LESS BEAM HANGER

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Supervising drilling operations of four large rigs, is the job held by E. A. Butler, field superintendent of

E. A. BUTLER

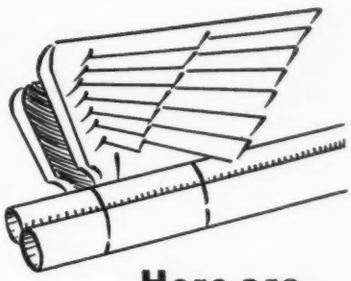
Nichlos Bros. Drilling Co., Houston. Since Mr. Butler became associated with the company in 1935, he has supervised the completion of some 26 wells, the majority being completed in the 8,300-foot sand at the Tepetate field for the Continental Oil Co.

Formerly an independent operator, Mr. Butler has made a special study of deep drilling and prior to his connection with his present company, he was with Trinity Drillers at San Antonio. During the past year and a half he has been stationed in the Louisiana Gulf Coast where he assisted in bringing in the discovery well at Tepetate and the past week he was on location at the Valentine Prospect in Lafourche Parish where this same rig, which has been given the title of "Lucky Rig," has apparently uncovered a new field for the Pan American Production Co.

There was very little new work reported by the Gulf Coast contractors the past week, the lull being brought about by the holiday season. Most of them are marking time until after the first of the year at which time a very active year of exploration is expected to begin due to the very urgent need of new oil reserves. Although the exploration for new reserves along the Gulf Coast has uncovered some 21 fields, only two or three are considered important.

The following is a summary of operations by the various contractors at the close of the week:

Contractor and location—	No. Rigs	Company	Status
Loffland Bros.:			
Matagorda County (Wild)	2	Continental Oil Co.	Drilling
Tepetate	2	Continental Oil Co.	Drilling
Vermilion Parish	1	Continental Oil Co.	Testing
Nichlos Bros. Drilling Co.:			
Porte Barre	1	Pan American Prod. Co.	Rigging up
Lafourche Parish (Wild)	1	Pan American Prod. Co.	Testing
Tepetate	2	Continental Oil Co.	Drilling
Smith & McDannald:			
Louise	1	Pure Oil Co.	Rigging up
South Houston	2	Stanolind Oil & Gas Co.	Drilling
Conroe	1	Smith & McDannald	Completed
Bosco	1	Superior Oil Prod. Co.	Testing
Sorrento	1	Pan American Prod. Co.	Drilling
Dickinson	1	Pure Oil Co.	Completed
Jennings	1	Shell Petroleum Corp.	Drilling
Lafayette Parish (Wild)	1	Shell Petroleum Corp.	Drilling
Matagorda County (Wild)	1	Continental Oil Co.	Rigging up
Rowan Drilling Co.:			
Fairbanks	1	Amerada-Stanolind O.&G.	Drilling
Plaquemines Parish (Wild)	1	Tide Water Oil Co.	Drilling
E. Baton Rouge Parish (Wild)	1	La. Crusader Oil Co.	Drilling
George Echols:			
Live Oak County (Wild)	1	Sun Oil Co.	Drilling
Refugio (Wild)	1	Circle W. Oil Co.	Drilling
Gillis	1	Fohs Oil Co.	Drilling
Quintana-O'Connor	1	Josey & Bruton	Drilling
Ben (Bud) Coyle:			
Jeanerette	3	Herton Oil Co.	Drilling
Harry L. Edwards:			
Dickinson	1	Kenben Oil Co.	Drilling
Edwards Drilling Co.:			
Magnet	1	Texas Crusader Oil Co.	Drilling
Hidalgo County (Wild)	1	McCollum Expl. Co.	Drilling
Fort Bend (Wild)	1	Sam Harrison	Drilling
Cron and Gracey:			
Manvel	1	Texas Co.	Completed
Hitchcock	1	Shell Petroleum Corp.	Workover
Flour Bluff	1	Barnsdall Oil Co.	Drilling
South Houston	1	Stanolind Oil & Gas Co.	Drilling
West Columbia	1	Texas Co.	Drilling
Aransas County (Wild)	1	Barnsdall Oil Co.	Drilling
Roanoke	1	Shell Petroleum Corp.	Drilling
Rutherford Drilling Co.:			
Van Vleck	1	Skelly Oil Co.	Completed



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THE OIL AND GAS JOURNAL

Kansas Developments

By
DAL DALRYMPLE

58-GRAVITY OIL AT GRABER; GUSHER REVIVES HISS FIELD

Production of 58-gravity oil in a well drilled by George P. Dickey in the Graber pool of McPherson County was a highlight of the week in Kansas oil fields. This is thought to be the highest gravity crude oil ever found in central Kansas. The well was the No. 1 Goering, SE section 17-21-1w, which produced 15 bbls. of 58-gravity oil daily, with about 3,000,000 feet of gas, from Chat, in addition to 1,290 bbls. of oil daily from Hunton lime, the formation from which other wells in the pool produce.

Completion of an 11,000-bbl. well in the Hiss pool of Barton County has revived interest in that sector. Work already has started at two new tests offsetting the big well. Previously, only two comparatively small producers in the pool had been completed and the area was defined on the northwest with a dry hole.

The largest well in the Silica field, which straddles the Rice-Barton County line, is the Mid-Continent Petroleum Corp. No. 6 Risse, SE section 6-20-10w, which pumped 3,001 bbls. of oil in 24 hours from Siliceous lime on a recent retest. Production was increased from 2,450 bbls. daily, the potential established when the well originally was completed about two months ago. The Silica pool now has a total daily potential in excess of 250,000 bbls., making it the largest field in Kansas.

Rose-Spring Drilling Co. apparently has opened a new producing area in Rice County at No. 1 Nantel, SW SE NE section 18-20-10w, south of the Wenke pool and northwest of the Raymond pool. It had a hole nearly full of oil from Siliceous lime topped at 3,278 feet, but had not been tested.

Kansas production again soared to a new high record during the past week. Many new wells were started, including wildcats, and Kansas operators were preparing for a busy 1937 drilling campaign. Work in the new year is expected to exceed that of 1936, which has been the busiest and most productive year in the history of Kansas oil.

Estimated Daily Production

Estimated daily average production of Kansas for the week ending December 26, and for the preceding week, was as follows:

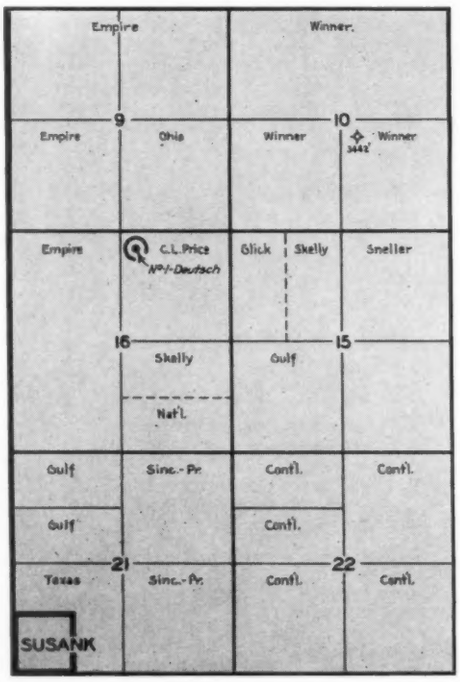
	Barrels	
	Dec. 26	Dec. 19
Oxford City	3,150	3,200
Burrton	14,000	14,125
Ritz-Canton	6,175	6,225
Hollow-Nikkel	3,550	3,600
Voshell	2,725	2,750
Ellsworth:		
Lorraine-South Lorraine	6,155	5,555
Other pools	1,129	1,370
Rice-Barton counties:		
Bloomer	2,655	2,195
Chase	9,925	9,885
Geneseo	1,895	1,900
Raymond	3,835	3,550
Silica	17,530	14,415
Keesling	2,915	1,840
Hauschild	2,960	2,670
Miscellaneous Rice	5,255	6,655
Miscellaneous Barton	4,038	4,770
Russell County	20,965	21,790
Sedgwick County	4,826	4,925
Ellis County	3,610	3,735
Kingman County	695	520
Stafford County	2,560	2,360
Greenwood County	10,000	9,975
Butler County	17,250	17,100
Other fields	28,352	28,490
Total Kansas	176,150	173,600

Rice County

Completions in Rice County included two wildcats in Township 21-7w. One was the Sage, Douglass and Yankey discovery well in the Saxman area, which has been producing for several weeks, and the other was Aylward and others No. 1 Johnson, NW NW NE section 17-21-7w, southeast of the Saxman pool and west of the Hauschild pool. It had Conglomerate at 3,358-60 feet; total depth, 3,390 feet. It flowed 710 bbls. of oil in six hours and made potential of 2,818 bbls.

Sage and others No. 1 Patton, SW cor. section 5-21-7w, opened the Saxman pool several weeks ago but was not officially completed until the past week. It topped Conglomerate at 3,329-37 feet; had pay at 3,331-37 feet; made potential of 1,137 bbls. of oil. It was deepened, had Chat at 3,365-66½ feet, total depth, and made potential of 1,560 bbls. of oil.

Other Rice County completions: Derby Oil Co. No. 2 Hauschild, SE SW SW section 11-21-7w:



C. L. Price opened a new oil pool at No. 1 Deutsch, NW NW NE section 16-16-13w, in northern Barton County and south of the Trapp area in Russell County.—(Mid-Continent Map Co., Wichita)

Conglomerate, 3,368 feet; total depth, 3,406 feet; flowed 701 bbls. in six hours; potential, 2,657 bbls.

J. H. Tatlock No. 3 Berscheit, NW NW SW section 6-20-10w; Siliceous lime, 3,283 feet; total depth, 3,284 feet; potential, 2,019 bbls. Same operator's No. 4 Berscheit, NW SW SW section 6-20-10w; Siliceous lime, 3,266 feet; total depth, 3,274 feet; potential, 1,773 bbls. Shell Petroleum Corp. No. 1 Bayer, SW SW SE section 29-19-10w; Siliceous lime, 3,282 feet; total depth, 3,297 feet; plugged back to 3,292 feet; pumped 35 bbls. of oil and 235 bbls. of water in 24 hours. Torry & Feaster and others No. 1 Wallace, SW SW NE section 32-19-9w; Siliceous lime, 3,214 feet; total depth, 3,244 feet; acidized; potential, 1,079 bbls. Ohio Oil Co. No. 1 Wilcox, NW NW SW section 18-19-9w; Siliceous lime, 3,270 feet; pay, 3,278-83 feet, total depth; acidized; potential, 1,144 bbls.

Charles Petroleum Corp. No. 1 Speck, NW NW SE section 29-20-8w, wildcat, topped Kansas City lime at 2,950 feet; Conglomerate, 3,145 feet; Siliceous lime, 3,650-72 feet, total depth; water; dry and abandoned.

Many New Tests

New work in Rice County: Sage and others No. 1 Gossman, SW SW NW section 9-21-7w, building rig; Garden-Haines Oil Co. No. 1 Snider, SE cor. section 9-21-7w, rig; Carey and others No. 1 Strange, NW SW NW section 16-21-7w, rig; L. E. Douglass No. 1 Potts, NE NE NW section 17-21-7w, cellar; Aylward and others No. 2 Johnson, SW NW NE section 17-21-7w, moving in material; Transwestern Oil Co. and others No. 5 Morna, C E half W half NW section 4-18-10w, rig; Mid-Continent Petroleum Corp. No. 4 Wood, SW NE NE section 4-20-10w, location; Bradley Oil Co. No. 4 Mitchell, NW SE SW section 32-19-10w, rigging up rotary; J. H. Tatlock No. 3 Drew, NW SW SW section 5-20-10w, building rig; same operator's No. 3 Berscheit A, SE SW SW section 6-20-10w, cellar; same operator's No. 5 Berscheit B, SW NW SW section 6-20-10w, building rig; National Refining Co. No. 8 Sherman, SE NE SW section 16-19-9w, location; Torry & Feaster No. 1 Ross, NW NW SE section 32-19-9w, old well deepened from 3,230 feet to 3,256 feet, acidized and pumped 819 bbls. of oil in 16 hours; E. V. Holland and others No. 1 Callis, NE SE SW section 32-19-9w, rig; H. V. Elwell and others No. 3 Brunkau, SE SE NW section 32-19-9w, old well deepened from 3,239 feet to 3,250 feet; acidized, swabbed at the rate of 35 bbls. of oil an hour.

Barton County

Two wildcat discovery wells were completed in Barton County. Armer & Vernon Oil & Gas Co. No. 1 Ainsworth, NE NE SE section 33-16-13w, northern part of the county, south of the Trapp area in Russell County, had Siliceous lime at 3,393-95 feet, total depth, and made potential of 1,241 bbls. of oil in 24 hours. It topped anhydrite at 865 feet; Kansas City lime, 3,154 feet.

C. L. Price No. 1 Deutsch, NW NW NE section 16-16-13w, about 3 miles north of the No. 1 Ainsworth, topped anhydrite at 870 feet; Topeka lime, 2,820 feet; Oswald lime, 3,135 feet; Siliceous lime, 3,386 feet; total depth, 3,390½ feet. It made potential of 939 bbls. of oil, with some water, in 24 hours, down four hours.

Other Barton County completions: Republic Oil Co. No. 4 Bloomer, SW SE NW section 36-17-11w; Siliceous lime, 3,276 feet; total depth, 3,300 feet; pumped 431 bbls. of oil in 22 hours; acidized; potential, 914 bbls. of oil. Skelly Oil Co. No. 5 Bloomer, NE SW NE section 36-17-11w; Siliceous, 3,269 feet; total depth, 3,275 feet; acidized; potential, 2,713 bbls. of oil. Same operator's No. 6 Bloomer, SW SE NE section 36-17-11w; Siliceous, 3,270 feet; total depth, 3,273 feet; potential, 3,733 bbls. of oil. Indian Territory Illuminating Oil Co. No. 1 Peter, C N half S half NW section 24-20-11w; Siliceous, 3,248 feet; total depth, 3,258 feet; potential, 1,964 bbls. of oil. Atlantic Refining Co. No. 1 Asher, C NE NW section 31-20-13w; Kansas City lime, 3,180 feet; total depth, 3,267 feet; flowed 200 bbls. of oil in five hours; acidized; made potential of 10,992 bbls. of oil. This well, in the Hiss pool, was considered the largest producer ever completed in Barton County.

The following new work in Barton County was reported: Empire Oil & Refining Co. No. 1 Wittig, NE NE NW section 16-16-13w, location; C. B. Davis and Gulf Oil Corp. No. 6 Steckel, SE NE SE section 1-20-11w, cellar; Lario Oil & Refining Co. and Atlantic Refining Co. No. 4 Peter, C S half N half NW section 24-20-11w, location; Simpson

Oil Co. and Atlantic Refining Co. No. 2 Hiss, SW NW NE section 31-20-13w, location.

Russell County

Only two wells were completed in Russell County, it being an unusually quiet week for that busy sector. Shell Petroleum Co. No. 3 Michaelis, NW SW NE section 31-15-13w, Trapp pool, made potential of 2,342 bbls. of oil after acidizing with 4,000 gallons. It topped Siliceous lime at 3,245 feet, set 7-inch casing at 3,256 feet and was bottomed at 3,250 feet. It swabbed at the rate of 63 bbls. an hour before acidizing.

Hartman & Blair No. 4 Harbough, SE SE SW section 25-14-15w, topped anhydrite at 753 feet; Kansas City, 2,923 feet; Gorham sand, 3,171 feet; pay, 3,174-77 feet, total depth, and made potential of 534 bbls.

The following new work in Russell County was reported: Thayer Drilling Co. and Dee Miller No. 1 Cook, SW cor. section 10-13-15w, wildcat, drilling at 620 feet; Bridgeport Machine Co. No. 3 Mills, SW SE SE section 33-13-15w, drilling at 360 feet; Texas Co. No. 1 Dumler, NW NW SE section 1-14-15w, moving in material; A. H. Witt No. 3 Witt, NW NE SE section 3-14-15w, cellar; Central Petroleum Co. No. 2 Foster B, SE SW NE section 3-14-15w, building rig; Darby Petroleum Co. No. 2 Dumler B, SW SW NW section 11-14-15w, building rig; Smoky Hill Oil Corp. No. 8 Miller, location.

Reno County

Magnolia Petroleum Co. No. 3 Harris, SW SW NW section 9-26-4w, Hilger pool, Reno County, made potential of 1,364 bbls. of oil after acidizing at 4,051 feet, total depth. Top of Chat was 3,615 feet; Misener sand, 4,009 feet; Viola lime, 4,050 feet. It was the only Reno County completion of the week.

First reports of new work in Reno County: Wilcox Oil & Gas Co. No. 1 Montford, NW NE SW section 12-23-4w, cellar; Ledo Oil Co. No. 3 Neufeldt, SE NW NW section 12-23-4w, location; Olson Oil Co. and Shell Petroleum Corp. No. 5 Duckworth, NE NW NE section 23-23-4w, old well, rigging up to deepen for water disposal well; Shell Petroleum Corp. No. 3 L. F. Whipple, C N half N half NW section 14-26-9w, rigging up rotary; Empire Oil & Refining Co. No. 1 Fluke, NW NE SW section 15-26-9w, moving in material; Ohio Oil Co. No. 2 Lawson, NE NE NW section 15-26-9w, moving in material.

Shell Petroleum Corp. No. 1 Ratzlaff, SE SW SE section 2-23-4w, an old well, was plugged back from 3,609 feet, total depth, to 3,400 feet; perforated casing with 47 shots at 3,275-3,350 feet; produced 3,000,000 feet of gas and a spray of oil and was to acidize.

Ellsworth County

Only well completed in Ellsworth County was James Davis No. 5 Edwards, NW NW SE section 34-17-8w, Geneseo district. It topped Kansas City lime at 2,870 feet; Siliceous lime, 3,254 feet; total depth, 3,261 feet; acidized with 4,000 gallons and pumped 1,168 bbls. of oil in 16 hours. It made potential of 1,792 bbls. in 23½ hours.

New work in Ellsworth County: Continental Oil Co. and Empire Oil & Refining Co. No. 8 Janssen B, NE NE SW section 34-17-8w, building rotary rig; same operators' No. 1 J. F. Rolfs, SW SW NE section 34-17-8w, building rotary rig; Carter Oil Co. and others No. 7 Ogden, SW NW SW section 26-17-9w, moving in material; same operators' No. 2 Anne, SE SE NE section 27-17-9w, old well deepening, fishing at 3,207 feet; same operators' No. 2 Elizabeth, S E half E half NE section 34-17-9w, location.

Stafford County

Stanolind Oil & Gas Co. and others No. 5 Heyen B, SE NE NE section 31-22-11w, Richardson pool, Stafford County, made potential of 1,429 bbls. of oil and was completed at 3,546 feet, total depth. Top of Siliceous lime was 3,539 feet.

C. E. Skiles No. 1 Ledigh, NW NW SW section 21-22-11w, wildcat northeast of Richardson, had a hole full of water at 3,650-53 feet, total depth, and was dry and abandoned. Top of anhydrite was 563 feet; gas at 2,767 feet; Kansas City, 2,360 feet; Conglomerate, 3,518 feet; Viola lime, 3,565 feet; Simpson, 3,580 feet; Siliceous lime, 3,634 feet.

Stanolind Oil & Gas Co. and others No. 3 Heyen A, SW NE NW section 31-22-11w, was an abandoned location.

Ellis County

Phillips Petroleum Co. No. 3 Bemis, C N half S half NE section 21-11-17w, Bemis area, Ellis County, made potential of 356 bbls. of oil, with 14 bbls. of water, after acidizing with 1,000 gallons, completed. Top of anhydrite was 1,056 feet; Siliceous lime, 3,363 feet; total depth, 3,382 feet. It pumper 76 bbls. of oil in three and one-half hour before acidizing.

British American Oil Producing Co. No. 3 Bemis, NW SW SW section 22-11-17w, was a location for the only new work reported in Ellis County.

Rush County

Morgan & Flynn and others No. 1 Schroeder, SW NW SE section 23-18-16w, Otis area, was the only completion in Rush County. It topped anhydrite at 945 feet; sand, 3,473 feet; total depth, 3,538 feet. It made potential of 1,292 bbls. of oil, with gas gauging 50,000,000 feet.

New work in Rush County: Northern Natural Gas Co. No. 1 Mauler, C SE section 12-18-16w, moving in material; Morgan & Flynn No. 2 Koril B, SE NE SW section 23-18-16w, location.

McPherson County

Two old wells were completed in the Graber area, McPherson County. Continental Oil Co. and others No. 3 Hetzke A, NW SW SE section 20-21-1w, topped Chat at 2,908 feet; Hunton lime, 3,291 feet; total depth, 3,329 feet. It was acidized with 4,000 gallons and made potential of 1,158 bbls. of oil.

Continental Oil Co. No. 1 Chavez, NE NW NE section 20-21-1w, was treated with 4,000 gallons of acid and swabbed 27 bbls. of oil in eight hours. It was acidized again with 6,000 gallons and made potential of 71 bbls. of oil, with 45 bbls. of water.

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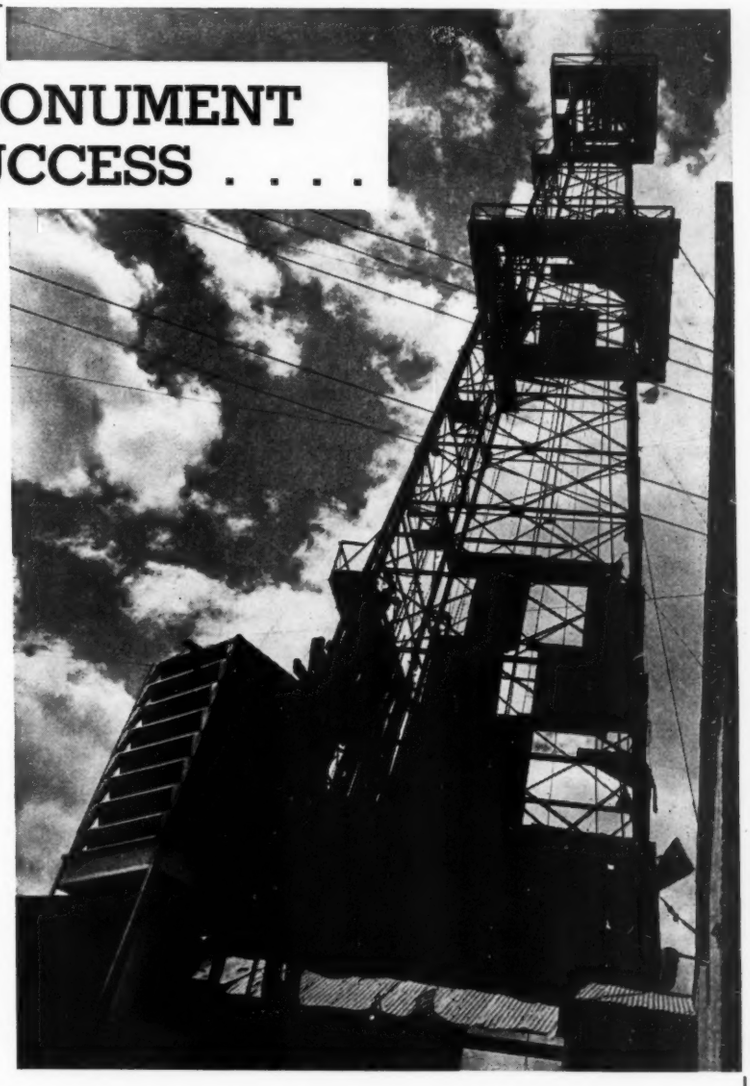

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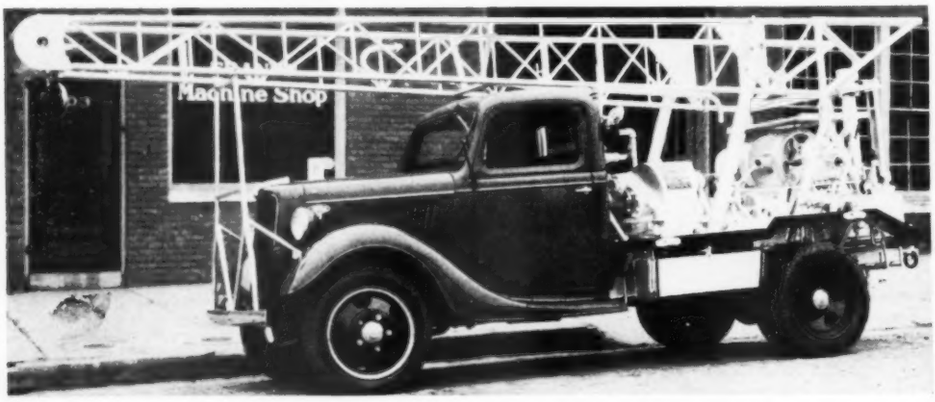

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Top of Chat was 2,917 feet; Hunton lime, 3,311 feet; total depth, 3,359 feet.

Hutchinson Oil Co. No. 1 Eaton, NW NE NE section 26-19-2w, was completed as a water disposal well.

Harvey County

Inca Production Co. No. 1 Moore, C NE NE section 26-24-3w, wildcat in southwestern Harvey County, was dry and abandoned at 3,091 feet, total depth. Top of Topeka lime was 2,020 feet; Kansas City lime 2,620 feet.

Shell Petroleum Corp. No. 1 Balzer-Siemens, C W half W half NE section 8-22-3w, was drilling at 1,520 feet when first reported.

Butler County

Empire Oil & Refining Co. No. 16 Lathrop, NW SW NW section 17-23-4, twin well in the Elbing field, Butler County, topped Kansas City lime at 1,962 feet and was bottomed at 2,103 feet. It was acidized with 2,000 gallons and pumped 679 bbls. of oil and 191 bbls. of water in 48 hours, completed.

Ohio Fuel Co. No. 4 Jacobs, C SE NW section 6-25-4, Potwin area, made potential of 68 bbls. of oil after acidizing with 2,000 gallons. Top of Kansas City lime was 2,200 feet; Mississippi lime, 2,650 feet; total depth, 2,676 feet.

Stanolind Oil & Gas Co. No. 6 Marshall, SW NW NW section 10-27-6, an old well, was deepened to 3,172 feet and completed as a water disposal well.

Andrew Ellison No. 1-A Shreve, NW SW SE section 11-28-4, had spudded. It was the only new operation reported in Butler County.

Cowley County

Home Natural Co. & McNish No. 2 Werner, SE SE SW section 31-32-6, wildcat, produced 2,500,000 feet of gas after drilling to 3,190 feet, total depth; plugging back to 1,900 feet and shooting at 1,865-80 feet. Top of Chat was 3,068 feet.

Trees Oil Co. No. 1 Pierson, SW NE NE section 19-30-4, topped Kansas City lime at 2,325 feet; sand, 2,850 feet; total depth, 2,893 feet; was shot with 35 quarts and pumped 50 bbls. of oil in 24 hours.

No new work was reported in Cowley County.

Chautauqua County

C. E. Skiles No. 1 Landon & Floyd, NW NW SE section 23-32-10, Chautauqua County, topped Oswego lime at 1,599 feet; Burgess sand, 1,924 feet; Mississippi lime, 1,945 feet; total depth, 1,966 feet. It was acidized with 1,000 gallons, and was estimated good for 150 bbls. of oil.

H. N. Holliday No. 21-A Holliday, C NE NW section 23-32-12, topped Siliceous lime at 1,833 feet; had a hole full of water at 1,836 feet, and was dry and abandoned at 1,842 feet, total depth. Denman Brothers No. 5 Shirk, C N half NE NW section 14-33-12, topped Siliceous lime at 1,809 feet; had a hole full of water at 1,812 feet, and was dry and abandoned at 1,825 feet, total depth.

New work in Chautauqua County: Brosius and others No. 1 Morris, SW NW SW section 6-32-12, drilling at 650 feet; Griffin Producing Co. No. 8 fee, SE cor. section 15-32-12, top lime at 1,618 feet and cleaning out at 1,640 feet; Sagamore Oil Co. No. 1 Kingston, NE NE NW section 17-32-10, rigging up machine; Denman Brothers No. 14 Shirk, C N half NE NW section 14-33-12, spudded.

Elk County

Diller Oil & Gas Co. No. 1 Hull, NE NE SE section 26-31-10, had dug ponds for a new well in Elk County.

Woodson County

Largest of two completions in Woodson County was the Alexander No. 2 Haas, SW SE SE section 22-23-14, northwestern part of the county. It topped lime at 1,615 feet; was bottomed at 1,633 feet; acidized with 4,000 gallons and pumped 200 bbls. of oil in 24 hours.

Cross & Field No. 5 Mason, SE NE SW section 14-25-13, had sand at 1,432-68 feet; plugged back to 1,443 feet; cleaned out and was bottomed at 1,479 feet, and pumped 3 bbls. of oil daily, completed.

Coffey County

Spencer and others No. 2 McLean, SE SW SW

(Continued on Page 307)

Texas and Louisiana Gulf

By
F. L. SINGLETON

ST. LANDRY AND LAFOURCHE PARISHES IN THE SPOTLIGHT

HOUSTON, Tex., Dec. 28.—Two new fields, one on the Cankton Prospect in St. Landry Parish, Louisiana, and the other in Polk County, Texas, were opened on the Gulf Coast the past week.

In addition, a wildcat on the Valentine Salt dome in Lafourche Parish, Louisiana, showed for a well and another new field, Coastal Louisiana, recorded a number of other interesting developments.

J. K. Dorrance and others No. 1 Sarah Wings, I.&G.N. Survey, No. 15, southeastern Polk County, opened a new field when it was completed flowing 511 bbls. of 40.0 gravity pipe-line oil through an 18/64-inch choke on a 24-hour gauge from the Upper Cockfield sand at 5,150-94 feet. Bottom of the hole is at 5,195 feet, in shale. The well had a tubing working pressure of 700 pounds with 900 pounds on the casing.

The well is located on the Segno Prospect, about 2½ miles east of the Ace field and is on what is known as the "Conroe trend."

Superior Oil Producing Co. No. 1 Adolph Savoie, 2 miles northeast of the Bosco field in section 26-8s-3e, St. Landry Parish, opened production from the Miocene sand when it flowed 41 bbls. of pipe line oil in 15 hours through an 18/64-inch choke, with tubing pressure 2,100 pounds and casing pressure 2,150 pounds. The hole was originally drilled to 9,428 feet in an attempt to find the producing horizons that are present in the Bosco field and after running an electrical coring test, the hole was plugged back to 6,576 feet and the casing perforated with 10 shots at 5,316-19½ feet. The electrical coring survey is reported to have recorded oil sands at the following intervals, 4,984-5,020, 5,272-5,324, 5,534-50, 5,780-5,806, 5,892-5,972 and 6,008-6,560 feet.

Evidence of a new field on the Valentine salt dome, Lafourche Parish, was revealed by Pan American Production Co. No. 1 Herang, which showed 180 feet of 36 gravity oil on a two-minute drill-stem test at 6,857-6,977 feet, total depth. The test also showed 25 pounds of working pressure along with 90 feet of sand and 180 feet of drilling mud. The oil sand was topped at 6,925 feet and was cored to a depth of 6,974 feet. The drill-stem test was made after an electrical coring test showed 150 ohms resistivity from 6,925-50 feet and 30 ohms resistivity from 6,950-74 feet. There were no showings of salt water.

No. 1 Herang is situated on the northwest flank of the dome in section 7-17s-20e, about 2,600 feet north of Barnsdall Oil Co. No. 1 Herang, abandoned several years ago below 7,000 feet, after encountering some encouraging showings of oil below 6,000 feet. The structure of the dome was outlined by the use of geophysical instruments in 1932 by Barnsdall Oil Co. The company drilled three deep tests and encountered salt at approximately 6,500 feet. The majority of the acreage around the dome is controlled by Barnsdall Oil Co., Pan American Production Co. and Gulf Oil Corp.

Preparations were being made to test the second deepest well in the world as Continental Oil Co. was attempting to run 5-inch casing to a depth of 12,197 feet which is the top of a section of sand showing oil and gas bottomed at 12,216 feet in No. 1 O. C. Hebert, located on the Abbeville Prospect, northern Vermilion Parish. The crew ran the casing as far the 9,600 feet but the pipe would go no farther. The pipe was pulled and the hole is being washed. The well is being tested in a sidetracked hole which was plugged back from a total depth of 11,732 feet where the drill stem became stuck. A whipstock was set above 10,800 feet and the hole sidetracked between 10,800 and 10,812 feet.

To the southeast, Stanolind Oil & Gas Co. No. 1 Stovall is waiting for fuel oil before drilling ahead from a depth of 10,212 feet. Several electrical coring tests have been made, but it is not known if they recorded any showings. The test is located on the south bank of the Intracoastal Canal at its intersection with the Vermilion River in Township 14s-3e.

Louisiana Crusader Oil Co. No. 1 State University, East Baton Rouge Parish, cored sand with a slight showing of oil at 6,454-62 feet, and after running an electrical coring test which showed 2 ohms and 120 millivolts porosity, a 15-minute drill-stem test was made from 6,383-6,625 feet, the total depth, and it showed seven stands of drilling mud and seven stands of salt water. No. 1 State is situated on the campus of the Louisiana State University in section 65-7s-1w.

North of the Houmas gas field, Terrebonne Parish, Humble Oil & Refining Co. is pulling stuck drill pipe from a total depth of 8,757 feet. Sand encountered at 8,208-35 feet appears to be gas sand and showed 80 ohms resistivity while from 8,547-62 feet it showed 10 ohms resistivity. Location is in section 23-19s-19e.

In the St. Martinsville field, St. Martin Parish, Continental Oil Co. No. 1-A fee, originally completed through perforated casing at 7,344-55½ feet, was plugged back and sidetracked at 6,310 feet and an electrical coring survey is to be made after sand showing oil and gas was cored from 7,454-64 feet.

On the west flank of the Jennings field, Acadia Parish, Superior Oil Producing Co. No. 1 Jennings Heywood is coring in sand below 6,700 feet. An electrical coring survey is reported to have showed approximately 10 feet of oil sand from 6,465-75 feet, and should it fail to encounter a deeper sand the hole will be plugged back and a test will be made at the 6,400-foot sand.

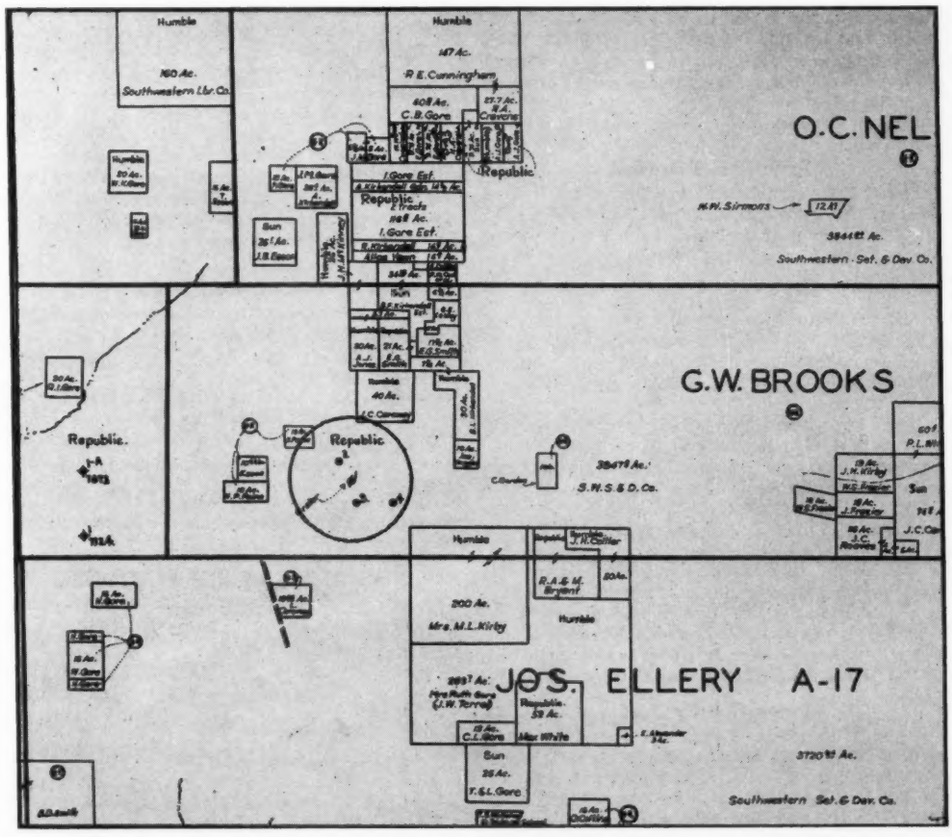
New activity was reported to the East Hackberry field, Cameron Parish, as Stanolind Oil & Gas Co. moved in material for No. 1 M. J. Muller located on the southeast flank of the dome, 300 feet east and 766 feet north of the southwest corner of the tract in section 23-12s-10w. The same company's No. 3 Mary Duhon in section 22-12s-10w, is being completed in 11 feet of oil sand bottomed at 5,775 feet.

Texas Coast

Along the Texas Gulf Coast interest was centered on the Cotton Lake area in Chambers County and the Segno Prospect, Polk County, where production tests were being made on two wildcats that may open new fields.

Approximately 2½ miles south of the Cotton Lake field, Chambers County, Salt Dome Oil Corp. No. 1-A Varuna Lawrence was flowing wash water with no showings of oil or gas after the hole had been washed for two hours. It is being tested at a

(Continued on Page 306)



Silsbee field, Hardin County, showing location of first producing well and new activity started by Republic Production Co. and Houston Oil Co.—(W. W. Zingery, Maps, Houston)

West and North Texas

By L. E. BREDBERG

FORTY NEW LOCATIONS CLOSE THE BUSIEST MONTH OF YEAR

FORT WORTH, Tex., Dec. 26.—Although a short week in checking new starts in the West Texas district, this week showed a total of 40 new locations which will get under way in drilling before the first of the year, closing out one of the busiest months ever seen in the district. Seventeen of the new starts were reported for Winkler County, which all year has been one of the three most active counties in the entire district, and which will continue to be so for the next many months as proven areas on the sand lime trend east of the Hendricks field are drilled up and these same areas extended and joined by new producers.

Only 19 tests were completed within this short week, two of which proved dry holes, the remainder producers. One of these proved the largest producer yet drilled in the Tubbs or Sand Hills area in western Crane County. The Humble Oil & Refining Co. drilled this well, its No. 5 Tubbs, in the northwest corner of section 11, Block B-27, P.S.L. Survey, completing it for 1,589 bbls., flowing in six hours. Total depth is 4,420 feet and the lime pay was topped at 4,310 feet. Before completing it was given a treatment of 6,000 gallons of acid.

In the same area the Gulf Oil Corporation is having difficulty in making a producer from the Simpson formation in No. 2 Waddell, about 2 miles northeast of its Ordovician producer, which was the first to be completed in the district outside of the Big Lake field in Reagan County. Number 2 Waddell was given a shot from 4,145-85 feet, but bailed only 27 bbls. of oil and 5 bbls. of water in 22 hours, the fluid level standing at 4,400 feet. The well is located in the southwest quarter of section 18, Block B-21, P.S.L. Survey, and is an important test for the area in view of the fact that it has chances of opening the fourth pay horizon for the Sand Hills sector.

Dawson Discovery

The Dawson County discovery of Ray Albaugh and others on the John Robinson farm, in section 46, Block M, E.L.&R.R. Survey, northwest corner of county, which is bottomed at 5,038 feet and has been pumping 4½ bbls. of oil per hour, exhausting the water previously showing with the oil, has been shut down for the past few days and will remain so until after the first of the year when it may be deepened and then acidized in an effort to increase its production. It is 12 miles northwest of Lamesa and is producing from the lime which was topped at 4,567 feet, the first oil showing at 4,945 feet. It was the latest discovery completed in 1936.

Questionable

What is to be done with the Uscan Oil Co.'s wildcat test on the Brownfield lands, located in section 54, Block K, P.S.L. Survey, in the southwest corner of Terry County, is yet to be decided. This test is now standing shut down for orders at a total depth of 5,504 feet. It is located approximately 11½ miles east of the Cascade Oil Corp. and others discovery on the Bennett Ranch in the southeast corner of Yoakum County and has been an extremely important test, but due to its present depth, with no oil or gas showings having been reported, it appears out of the picture as far as production from the Yoakum pay is concerned.

Ector Extensions

Two important wells are now in the making, which will prove extensions and connecting links between pools in the northwestern part of Ector County. Shasta Oil Co. and Cordova Union Oil Co.'s No. 1 Scharbauer, located in section 29, Block 44, Township 1n, T.&P. Survey, about midway between the Goldsmith field on the southeast and the Cummins pool on the northwest, is drilling to 4,200 feet after logging an increase in oil at 4,153-82 feet. Its first show of oil was at 4,132-47 feet. It is now flowing 10 bbls. of oil per hour from the lime, confident of making a producer and thereby an extension. It will probably be acidized or shot, or both, at 4,200 feet. It is also about 1 mile northeast of a well completed by Humble Oil & Refining Co. in section 30, same block and survey. This well was shot and acidized twice, making 915 bbls. of oil per day, and also proving a linking well between the two pools.

The Texas Pacific Coal & Oil Co. No. 1 Scharbauer, located in the NE cor. of section 31, same block and survey as the above two wells, and 1 mile southeast of the new Humble extension well, and about midway between the Goldsmith and Cummins fields, is also proving a link between the two pools. While drilling below 4,165 feet it was flowing 3 bbls. of oil per hour. It is now drilling at 4,200 feet, and will probably be carried another 50 or 60 feet, then acidized or shot, or both to step up its production.

These important wells, extending the Goldsmith field into the Cummins field, would make one large field 8 miles in length from southeast to northwest, with the probability that it will be extended another 4 or 5 miles northwest, proving one of the largest fields in the district and the largest in Ector County. It is also proven for about 2 miles in width with no defining tests on either side. A new location made one-half mile south of the Goldsmith field by Gulf Oil Corp. in section 27, Block 44, Township 1s, T.&P. Survey, will prove whether or not the field is to run farther south. It is an important location from that standpoint, proving up more territory or defining the field on the south end.

Penn Pool Extended

Shell Petroleum Corp. No. 1 University, located in section 3, Block 2, University Lands, extended the Penn pool near Judkins, Ector County, about three-eighths of a mile to the south this week when it started heading oil at 3,660 feet, after topping broken pay at 3,560 feet. It was shut down at the former depth to be given a shot, sure of making a producer and proving up more acreage to the field, some of the acreage of which is to be leased under bid by the state of Texas at Austin on February 26.

The Devonian Oil Co.'s No. 1 Scharbauer, SE quarter of section 34, Block 44, Township 1n, T.&P. Survey, 1 mile east of producers on the north end of the Goldsmith field, is showing for a producer. It was drilled to 4,225 feet, but showed water and was forced to plug back to shut it off. Total depth is now 4,214 feet, where the well is now standing with 1,500 feet of oil in the hole, coming from the lime at 4,177-89 feet and 4,200-08 feet. It will either be acidized or shot at this plugged-back depth, and will make a commercial producer and prove considerable more territory to the north end of the Goldsmith field, in Ector County.

Jones County Test

Merry Brothers & Perini and Forest Development Co. No. 2 White, located in section 6, Block 15, T.&P. Survey, three-quarters of a mile west of the Sandy Ridge pool in eastern Jones County, and 800 feet west of a dry hole drilled by the same operators to a total depth or 2,376 feet, is showing for a producer and also an extension well after filling 140 feet with light green oil from a soft lime streak encountered between 2,329 and 2,337 feet. It is to be acidized at the latter depth to prove whether or not it is to make a commercial producer and add more producing acreage to the Sandy Ridge pool.

North Texas

The Cato Oil Co. No. 1 Bryson, located in the I. Hughson Survey, northeast of Bryson in Jack County, is promising the linking of the new east and north pools in the Bryson area and is to be completed this week. It logged the pay at 3,038 feet and is drilling to the lower pay with a hole full of oil. Another linking test in this area is the Robert Viehl No. 1 Ezell, in the Lewis Knight Survey, one-half mile south of the town of Bryson. It will link the south, north and east pools in the area if it proves a producer. A showing of oil and gas has already been encountered, and pipe has been set and cemented, test to be made some time this week. If these two tests prove producers, and one is sure of doing so, they will open a townsite drilling campaign in Bryson which will place this pool as one of the most active areas in the state. The Texas Pipe Line Co. is the sole crude purchaser in the area, now taking oil from over 200 wells, the majority of which have been completed since the field's discovery last year by Oil Industries of Fort Worth, southeast of Bryson.

South of the town of Gainesville, Seitz, Comegys and Seitz are ready to spud in their wildcat on lands of the First State Stock & Land Bank, in the Wheelock Survey, about 2 miles out of town, and about the same distance southwest of the Anderson-Kerr pool, Cooke County.

Eppenauer Drilling Co. and others apparently have a new discovery in the making in their No. 1 Eddleman Brothers, located in the T.&N.O. Survey, 2 miles east of Graham in Young County. It was spraying oil and making a large amount of gas when shut in at 4,209 feet to erect storage.

Many drilling operations were shut down over the holidays in the North Texas and West Central Texas districts, until after the first of the year. Thirty-one completions were reported for the North Texas district.

Panhandle District

There were only five wells completed in the Panhandle district this week due to a short week because of the holiday. At the same time 11 locations were reported.

The Uscan Oil Co. is going back into the old Western Union Oil Co. hole on the Farwell ranch, in the center of the NW quarter of section 18, Block 3n, Range 2e, in Deaf Smith County, and is now moving in material to carry the test deeper from 1,565 feet where the Western Union company gave it up. This is an extreme wildcat test for the district.

WEST TEXAS COMPLETIONS

Crane County

Humble Oil & Refining Co. No. 5 Tubb, 4,310-4,420 feet, acidized, 1,589 bbls. in six hours.

Ector County

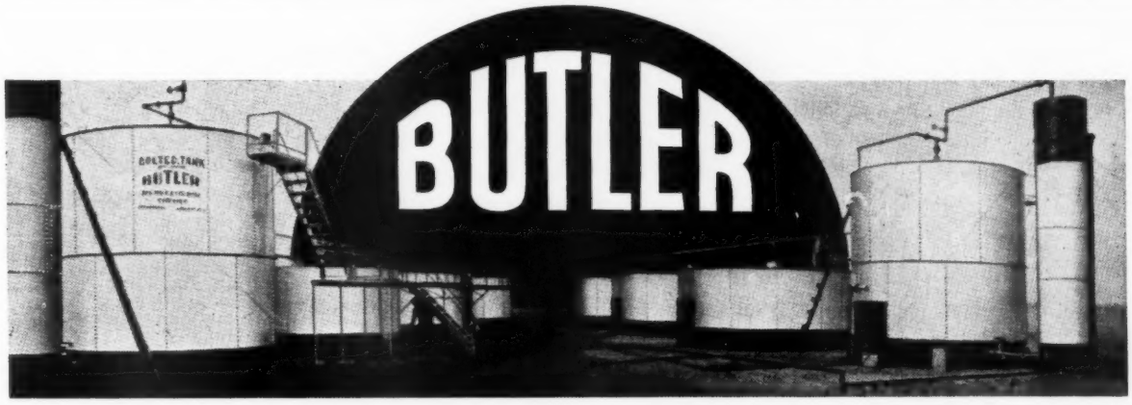
Gulf Oil Corp. No. 10-B Connell, 3,435-3,700 feet, 406 bbls.

Garza County

Grisham and Hunter Corp. No. 1 Post Estate, junked and abandoned at 2,410 feet.

Fisher County

General Crude Oil Co. No. 6 Willingham, 3,093-



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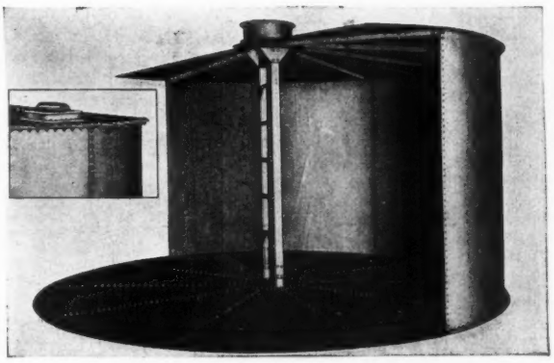

STEEL BUILDINGS

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At the extreme right, section units of a Butler Steel Building are shown laid out. Erection is reduced to a quick and easy matter of raising the wall section units to position and bolting together the structural frame corners. Then, as shown in the third picture from the right, one-piece corner sheating is bolted on each corner. Gable ends and roof go on with equal simplicity and speed. (See fourth picture from the right.)

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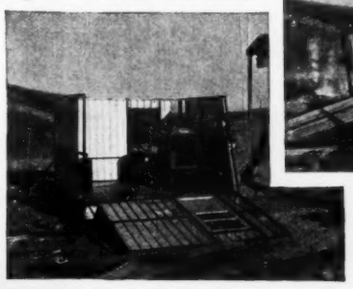

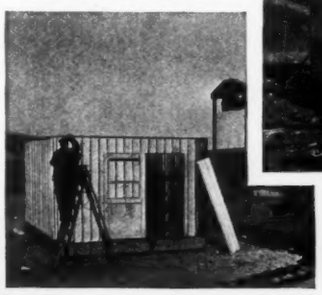

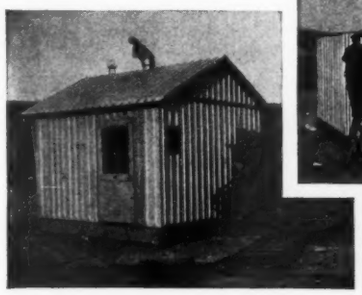

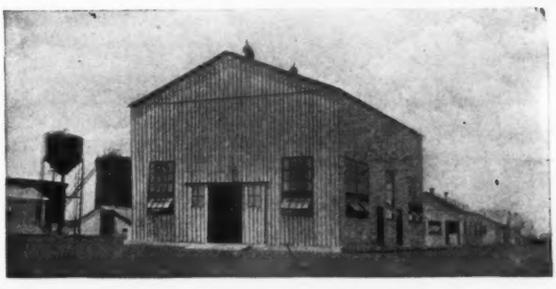

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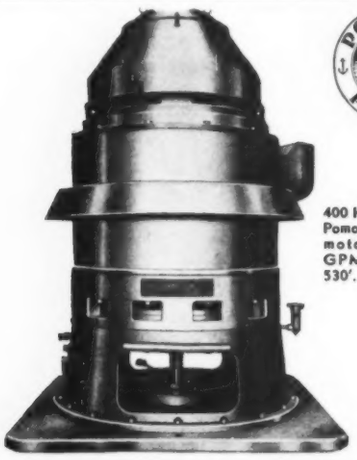

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3,119 feet, 740 bbls. on pump. Southern Oil Corp. No. 1 Edwards, dry and abandoned at 3,364 feet.

Howard County

Ed S. Holman No. 3 Kloh, 2,315-30 feet, 28 bbls. per hour on pump.

Pecos County

Cardinal Oil Co. No. 2-C Smith, 1,667-1,705 feet, 3 bbls. per hour on pump.

Upton County

J. W. Ellis and others No. 6-B Robbins, 2,225-55 feet, 776 bbls. on pump. Eppenauer Drilling Co. No. 2 Perry, 1,963-2,087 feet, 71 bbls. oil and 70 bbls. water on pump.

Ward County

Atlantic Refining Co. No. 1-B University, 2,570-2,745 feet, 959 bbls. Merry Brothers & Perini No. 1 Hathaway, 2,509-2,615 feet, 3,347 bbls. Republic Production Co. No. 5 Fox, 2,244-2,312 feet, 158 bbls. Sinclair Prairie Oil Co. No. 3-A Carnegie, 2,201-2,310 feet, 40 bbls. Tide Water Oil Co. No. 3 Johnson, 2,450-2,622 feet, 583 bbls.

Winkler County

Atlantic Refining Co. No. 3-E Leck, 3,000-70 feet, 2,670 bbls. Magnolia Petroleum Co. No. 45 Walton, 2,715-2,992 feet, 475 bbls. Navarro Oil Co. No. 4 Crenshaw, 2,710-3,133 feet, 1,150 bbls. Sinclair Prairie Oil Co. No. 6-C Walton, 2,830-2,975 feet, 1,305 bbls. Uscan Oil Co. No. 2 Daugherty, 3,050-3,104 feet, 416 bbls.

NORTH TEXAS COMPLETIONS

Archer County

L. T. Burns No. 96 J. H. White, 2,475 feet, dry. Burns & Long No. 3 Wilson T, 2,211-16 feet, 150 bbls. H. H. Fraser No. 13 Wilson B, 900 feet, dry. W. E. Maxson, Jr. No. 44 Green B, 1,111-28 feet, 50 bbls. McChesney and others No. 1 Benson, 460 feet, junked. T. J. McCurdy No. 1 M. F. Martin, 978-81 feet, 25 bbls. Bo Minnich No. 2 W. H. Taylor, 1,230 feet, dry. E. J. Stump No. 1 Wilson B, 965 feet, junked. Texas Co. No. 1 Hamilton, 1,398 feet, dry.

Jack County

Bennett Petroleum Corp. No. 3 Chambers, 2,950-90 feet, 960 bbls. Hamilton Petroleum Co. No. 2 Kuykendall, 2,365-75 feet, 350 bbls. Hammon & Meredith No. 2 Rhodes, 2,420-30 feet, 400 bbls. Hill & Hill No. 2 Eatherly, 2,956-3,000 feet, 550 bbls. T. D. Humphrey No. 8 J. M. Birdwell, 2,933-3,062 feet, 300 bbls.; No. 6 J. M. Birdwell, 2,937-3,005 feet, 75 bbls.; No. 7 Rankin, 2,960-3,003 feet, 400 bbls. H. S. Moss No. 2 Lowe, 2,979-3,006 feet, 500 bbls. L. J. Perrin No. 1 J. R. Clayton, 2,980-3,000 feet, 450 bbls.

Montague County

Continental Oil Co. No. 31 Howard, 1,215-35 feet, 45 bbls.

Wichita County

Culbertson Co. No. 80 Waggoner, 1,359-70 feet, 35 bbls. King Oil Co. No. 3 Waggoner I, 1,832-50 feet, 50 bbls. Pois & Schultz No. 2 Foster B, 1,265-75 feet, 100 bbls. G. W. Proctor No. 2 Foster A, 1,085-1,100 feet, 100 bbls. Reno Oil Co. No. 2 Waggoner, 2,007 feet, dry.

Wilbarger County

Wilson Oil Co. No. 2 Mulloy, 641 feet, dry.

Young County

Paul Atchley No. 1 J. K. Thomas, 1,070 feet, dry. J. W. Eagleston No. 1 S. O. Wall, 600 feet, dry. D. M. Knox No. 3 Jarnigan, 3,805-4,026 feet, 25 bbls. Piper & Wilson No. 2 Scott, 748-49 feet, 30 bbls. O. G. Turner No. 1 Mrs. M. K. Cross, 638 feet, dry. White & Duncan No. 4 Prideaux A, 730-85 feet, 10 bbls.

PANHANDLE COMPLETIONS

Gray County

Champlin Oil & Refining Co. No. 14 McLaughlin, 2,920-3,000 feet, 340 bbls. on pump. Hagy and others No. 2 Fields, 2,537-2,678 feet, 23,500,000 feet of gas. King Oil Co. No. 4 Sailor, 3,140-3,264 feet, shot, 403 bbls. on pump. Magnolia Petroleum Co. No. 5 Haggard, 3,217-3,301 feet, shot, 645 bbls. on pump; No. 2 Sailor, 3,198-3,230 feet, shot, 618 bbls.

(Continued on Page 307)

Oklahoma Operations

By
DAL DALRYMPLE

TWO STATE POOLS EXTENDED; NEW HUNTON WELL AT FITTS

Extensions of the Olympic and Billings pools, completion of several large producers in the Edmond and Fitts fields, and a revival of activity in Noble County as a result of new strikes were features of the week in Oklahoma oil areas.

The Okfuskee County sector of the Olympic pool was extended nearly one-half mile north at W. A. Delaney's well in NE NE section 18-10-9, which was estimated good for 100 bbls. of oil daily. It had not been completed, but was cleaning out after a shot at 1,870-1,911 feet. The area also was due to be extended one location west at J. J. Deaner's well in SE SE NW section 18-10-9, which had saturated sand at 1,873 feet.

The Billings pool of Noble County was extended one-fourth mile southwest at Tide Water Oil Co. No. 1 Hackett, NE NW SE section 21-23-2w. It made potential of 2,252 bbls. of oil in 24 hours, producing from Wilcox sand at 4,321-35 feet, total depth. Gas gauged 3,600,000 feet. As a result of this extensioner and the wildcat strike south of the town of Lucien, several new tests are starting or are projected for early starts in western Noble County.

Three new wells in the Edmond field, Oklahoma County, were due to complete soon, and one completed potential test. It was Ohio Oil Co. and Gulf Production Co. No. 3 Hathaway, NE SE NW section 6-13-3w, southwest part of the field. It made potential of 3,814 bbls. of oil, with about 5,000,000 feet of gas. Production was from Wilcox sand, total depth 6,730 feet. Ohio Oil Co.'s No. 1 McMillan, NW NW SW section 31-14-3w, was cleaning out after a shot at 6,670-85 feet, and same operator's No. 2 McMillan, NE NW SW section 31-14-3w, flowed at the rate of 74 bbls. an hour while drilling at 6,681 feet. Continental Oil Co. No. 14 Young, NW cor. section 31-14-3w, flowed 84 bbls. of oil in two and one-half hours, and was bottomed at 6,699 feet.

J. Paul Getty and Minnehoma Oil & Gas Co. extended the Hunton lime producing area of the Fitts field, Pontotoc County, one-half mile northeast at No. 1 Masters, NW NE SW section 23-2n-7. It flowed 922 bbls. of oil naturally in one hour through casing. It had Hunton lime at 3,698-4,075 feet, and was bottomed at 4,079 feet in Sylvan shale.

Pontotoc County

Four new oil wells were completed in the Fitts field, Pontotoc County. Blackstock & Deaner No. 5 Moody, SW NW SW section 23-2n-7, topped Viola lime at 4,018 feet; Bromide, 4,295 feet; total depth, 4,391 feet; acidized with 15,000 gallons and flowed 278 bbls. of oil in six hours through tubing, making potential of 826 bbls.

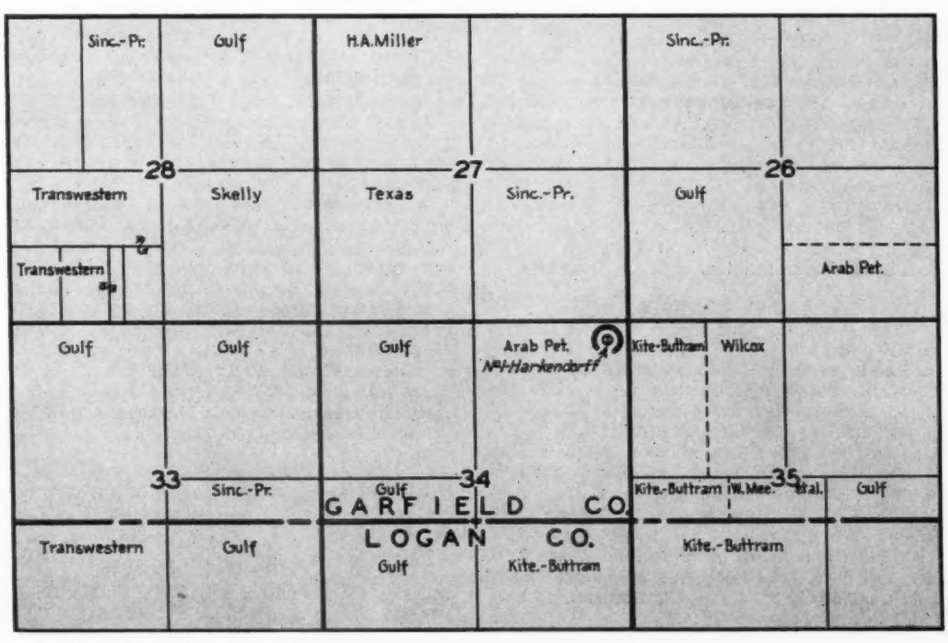
Simpson & Fell No. 5 Westheimer, NW SW NW section 26-2n-7, was acidized with 15,000 gallons and flowed 920 bbls. of oil in 24 hours through tubing, gross. Top of Bromide was 4,055 feet; McLish, 4,257 feet; total depth, 4,353 feet.

Sinclair Prairie Oil Co. No. 15 Burris, NE NW NW section 27-2n-7, topped Hunton lime at 3,420 feet; total depth, 3,525 feet; acidized with 10,000 gallons, flowed 434 bbls. of oil in two hours through tubing and casing and made potential of 4,091 bbls.

Fleetborn & Simpson No. 3-A Woolley, NW NE SE section 28-2n-7, flowed 155 bbls. of oil through tubing in one hour after acidizing with 9,000 gallons, and made potential of 3,288 bbls. Hunton lime was topped at 3,240 feet; total depth, 3,518 feet.

Boettcher Oil & Gas Co. No. 5 Starrett, NE NE SE section 23-4-7, had sand at 1,723 feet; was bottomed at 1,730 feet; shot with 20 quarts and pumped 27 bbls. of oil in 24 hours. Benedum-Trees Oil Co. No. 4 Coker, NE NW NW section 31-5-5, topped Viola lime at 2,542 feet; total depth, 2,648 feet; acidized and shot and pumped 15 bbls. of oil and 1 bbl. of water in 24 hours. Caprock Oil Co. No. 5 Layne, NE NW NW section 30-5-5, had a hole full of water at 2,895-97 feet, total depth; plugged back to 2,320 feet, shot and acidized and pumped 10 bbls. of oil in 24 hours. F. N. Campbell and others No. 2 Northam, NW NW SE section 30-5-5, topped Viola lime at 2,461 feet; total depth, 2,561 feet; acidized and pumped 20 bbls. of oil in 24 hours.

New work in Pontotoc County: Mid-Tex Petroleum Co. No. 1 Porter, NW SE NW section 31-5-4, rigging up rotary; E. H. Moore and others No. 1 G. C. Walker, NW cor. section 8-2-7, rigging up standard tools at 365 feet; C. Andree and others No. 1 Pettyjohn, NW NE SE SE section 2-1n-7, drilling at 750 feet; Amerada Petroleum Corp. No. 6 Woolley, SE NE SE section 21-2-7, moving in rotary; E. H. Moore and others No. 1 T. McCarty, SE SW NE section 22-2-7, cellar; same operator's No. 1 Deaner, NW SW SE section 23-2-7, old well preparing to plug back; Skelly Oil Co. No. 2 Ingram, NE NW SW section 23-2-7, rig on ground; Amerada Petroleum Corp. No. 5 G. Smith, SE SW NW section 28-2-7, rig corners; Mabee Consolidated Corp. No. 1-A Smith, SW SW NW section 28-2-7, building rig.



Work has started at Arab Petroleum Co. No. 1 Harkendorff, NE cor. section 34-20-3w, wildcat in southeastern Garfield County, near the Logan County line.—(Mid-Continent Map Co., Tulsa)

Estimated Daily Production

Estimated daily average production of Oklahoma for the week ending December 26, and for the preceding week, was as follows:

	Barrels	
	Dec. 26	Dec. 19
Allen	7,500	7,550
Burbank	7,925	7,950
South Burbank	15,250	15,025
Balance Osage	20,900	21,000
Blackwell district	5,100	5,125
Bristow-Slick	8,100	8,125
Chandler	3,675	3,700
Crescent	9,725	8,250
Cromwell	3,350	3,475
Cushing-Shamrock	10,300	10,500
Duncan district	3,925	3,950
Edmond	16,350	15,025
Fish	7,075	7,100
Fitts	69,450	72,250
Gray	1,375	1,400
Graham	4,975	4,950
Healdton	9,700	9,750
Hewitt	4,500	4,500
Holdenville	975	950
Keokuk	6,875	7,175
Konawa	1,700	1,725
Lucien	13,750	12,250
Marshall-Lovell	675	650
Oklahoma City	160,325	162,225
Olympic	11,650	11,550
Papoose	975	975
Polo	2,350	2,300
Sasakwa and townsite	3,025	3,200
Sholem-Alechem	3,300	3,325
Seminole:		
Bowlegs	11,900	12,200
Carr City	5,950	6,050
Earlsboro	6,175	6,150
South Earlsboro	750	750
East Earlsboro	8,525	8,550
Little River	11,750	12,200
East Little River	1,050	1,025
Maud	800	1,000
Mission	2,250	2,325
Seminole	9,750	10,600
East Seminole	4,100	4,150
Searight	4,700	4,850
Total Seminole	67,700	69,850
St. Louis-Pearson	22,900	23,200
Tatums	3,500	3,525
Tonkawa-Garber-Thomas	5,500	5,450
Wewoka	3,800	3,825
Yale-Jennings	3,975	4,000
Other pools	72,450	71,575
Total Oklahoma	595,600	597,375

Okfuskee County

The Olympic area of Okfuskee and Hughes counties continues one of the more active fields in Oklahoma, with the Okfuskee County extensions getting the bigger play right now. Okfuskee completions:

Chapman & McFarlin, NE NW SE section 25-10-8, topped Senora sand at 1,748 feet; total depth, 1,780 feet; shot and flowed 293 bbls. of oil in 24 hours. J. H. Chapman No. 7 Cudjo, NE SW

SE section 25-10-8, topped Senora sand at 1,722 feet; was bottomed at 1,761 feet; shot and flowed 987 bbls. of oil in 24 hours. Manahan Oil Co. No. 3 Black, NE NE SE section 25-10-8, made potential of 1,002 bbls. of oil in 24 hours after an 80-quart shot on Senora sand topped at 1,734 feet; total depth, 1,774 feet. Blackwell Oil & Gas Co. No. 10 Dalton, NW NW NE section 36-10-8, flowed 400 bbls. of oil in 24 hours after a shot. Top of Senora sand was 1,720 feet; total depth, 1,747 feet. Same operator's No. 12 Dalton, SW NW NE section 36-10-8, topped Senora sand at 1,725 feet, was bottomed at 1,747 feet, shot, and flowed 325 bbls. of oil in 24 hours. Earl Evans and others No. 1 Smith, NE NE NW section 36-10-8, flowed 400 bbls. of oil in 18 hours from Senora sand at 1,726 feet; total depth, 1,745 feet. J. H. Chapman No. 1 Williams, SW SW NW section 30-10-9, flowed 739 bbls. of oil in 24 hours from Senora sand at 1,721 feet; total depth, 1,760 feet.

New work in Okfuskee County: Chapman & McFarlin No. 3 K. Williams, SW SE SW section 25-10-8, rigging up rotary; Stanolind Oil & Gas Co. No. 1 Bunner, SE SE NE section 25-10-8, rig; Blackwell Oil & Gas Co. No. 15 Dalton, SE SW NE section 36-10-8, set 10-inch casing at 42 feet, waiting on cement; same operator's No. 16 Dalton, NE SW NE section 36-10-8, set 10-inch casing at 41 feet, waiting on cement; Manahan Oil Co. No. 14 DeHon, NE NW SE section 36-10-8, cellar; same operator's No. 15 Dalton, NW NW SE section 36-10-8, cellar; same operator's No. 16 DeHon, NE NE SW section 36-10-8, location; G. B. Suppes No. 1 Whitfield, NE NW NW section 2-10-9, location; Ark Royalty Co. No. 5 Fisher, NW NW SE section 18-10-9, spudded; J. V. Deaner No. 2 Scholtz, NE SE NW section 18-10-9, rig.

Oklahoma County

Three oil wells were completed in the Oklahoma City field, Oklahoma County. Largest was British American Oil Producing Co. No. 1 Francis Heights, SW SE SW section 22-12-3w. It topped best pay and Simpson horizon at 6,395 feet; second Wilcox sand, 6,452 feet; total depth, 6,510 feet. It made potential of 2,189 bbls. of oil; was shot with 116 quarts at 6,431-6,503 feet, and made new potential of 3,257 bbls. of oil.

Clark & Co. No. 1 Noffsinger, SW NW NW section 23-12-3w, topped Simpson at 6,325 feet; second Wilcox sand, 6,405 feet; total depth, 6,493 feet. It made potential of 1,165 bbls. of oil.

Rosemary Oil Co. No. 1 Long, NW SW SW section 7-11-2w, pumped 142 bbls. of oil in 76 hours after raising tubing to 5,496 feet, and was completed. It previously was shot with 30 quarts and pumped 30 bbls. of oil in 2½ hours. Production was from Cleveland sand, topped at 5,482 feet; total depth, 5,546 feet.

Transwestern Oil Co. and Sinclair Prairie Oil Co. No. 1 Belle McGrew, SW SE SW section 20-13-3w, Britton district, topped Simpson dense at 6,545 feet; total depth, 6,680 feet, completed. It flowed 249 bbls. of oil in four hours, making potential of 1,496 bbls. of oil, with 5,125,000 feet of gas.

Ohio Oil Co. No. 1 Yeager, NE NW SW section 5-13-3w, southeast end of Edmond field, topped second Wilcox sand at 6,752 feet; based it at 6,910 feet; was bottomed at 7,000 feet and was completed as a salt water disposal well.

Southwestern Drilling Co. No. 1 Mudge, block 2, Park subdivision of Oak Park, section 34-12-3w, the only new operation reported in Oklahoma County, was a rig.

Seminole County

Seminole County completions were as follows: Carter Oil Co. and others No. 3 Sanford, Community No. 2, NW NE SE section 16-9-6, Booch sand 3,567 feet; total depth, 3,605 feet; plugged back to 3,580 feet and shot; pumped 16 bbls. of oil in 24 hours. Murphy Oil Co. No. 1 Mayhue, NE NW NW section 14-9-6, an old well, deepened from 3,913 feet to Wilcox sand, 4,116 feet; pay, 4,134 feet; total depth, 4,136 feet; pumped 283 bbls. of oil and 40 bbls. of water in 24 hours, recompleted. Magnolia Petroleum Co. No. 5 Browning, C W half SW NW section 14-10-6, an old well; deepened from 4,182 feet to 4,187½ feet; plugged back to 4,184 feet; acidized; made potential of 787 bbls. of oil, with 2 per cent water, recompleted. C. J. Wrightsman No. 1 May, SE SW SW section 25-10-7; Gilcrease sand, 3,515 feet; total depth, 3,640 feet; flowed 390 bbls. of oil in 4½ hours. Winona-Jarvis-Holmes No. 1 Wolf, SW SW SE section 18-7-8, an old well, deepened from 3,085 feet to 3,112 feet; flowed 40 bbls. of oil and 30 bbls. of water in 24 hours, recompleted. Exchange Drilling Co. No. 1 Carolina, NE SE NE section 8-6-7, Wilcox sand, 4,035 feet; salt water, 4,039 feet; total depth, 4,040 feet; plugged back to 4,038 feet; shot; oil exhausted, water increased; dry and abandoned. Wood Oil Co. No. 2 Ashby, SE NE NW section 22-7-5, topped Dolomite, 4,096 feet; total depth, 4,140 feet; acidized; swabbed 148 bbls. of oil in 24 hours; reacidized, swabbed 134 bbls. in 24 hours and pumped 40 bbls. of oil in 24 hours.

The following new work was reported in Seminole County: Amerada Petroleum Corp. and others No. 2 Klabzuba, NW SW SE section 35-11-5, building rig; same operator's No. 2 Parks, SE NE SW section 35-11-5, building rig; Gulf Oil Corp. No. 1 Myrtle, CNL SW NE section 26-11-6, rig; Amerada Petroleum Corp. and others No. 1 Noble, SW SE SW section 25-10-7, building rig; same operator's No. 2 Yahola, NW cor. section 36-10-7, building rig; Winona-Jarvis-Holmes No. 2 Wolfe, SE SW SE section 18-7-8, old well, rigging up to deepen; Vierson and others No. 1 Long, NE NW SE section 32-8-8, old well, cleaning out, to deepen; same operator's No. 7 Jones, NE NW NW section 11-6-6, old well, deepened from 2,405 feet to 2,430 feet and plugged back to 2,407 feet, shot, flowed 121 bbls. in three days, preparing to reshoot.

Osage County

Carter Oil Co. and others No. 4 Walter Mosier, SE NE SW section 34-26-6, South Burbank area, Osage County, topped Bartlesville sand at 2,832 feet; total depth, 2,903 feet, and was completed, flowing at the rate of 175 bbls. of oil per day.

Lewis Production Co. and Continental Oil Co. No. 17 Osage, SW cor. section 16-24-7, Naval Reserve district, topped Big lime at 2,310 feet; pink lime, 2,638 feet; Bartlesville sand, 2,647 feet; total depth, 2,677 feet. It flowed 100 bbls. of oil naturally in the first 24 hours, and 270 bbls. of oil in 24 hours through tubing after shooting.

Coralena Oil Co. No. 1 Osage, SW cor. section 13-24-7, topped Chat at 2,468 feet and was dry and abandoned at 2,502 feet, total depth.

Bay Oil Corp. No. 3 Osage, SE SW NW section 25-22-7, topped first Wilcox sand at 2,825 feet; had Hominy-Wilcox series at 2,838-2,913 feet; total depth, 2,932 feet; plugged back to 2,914 feet shot with 60 quarts and swabbed 25 bbls. of oil per day.

Midco Oil Corp. No. 13 Osage, SE cor. section 18-22-10, an old well, was deepened from 1,950 feet to 2,025 feet, pumped 15 bbls. of oil, with 1,500,000 feet of gas daily, and was recompleted. Link Oil Co. and others No. 9 Osage, SW NW NE section 4-22-12, an old well, was deepened from 1,624 feet to 1,661 feet, pumped 15 bbls. of oil per day and was recompleted.

New work in Osage County: Ohio Osage Oil Co. and others No. 7 Osage, NE cor. section 17-21-9, location; Bay Oil Corp. No. 3 Osage, SE NW SW section 25-22-7, rig on ground; Royal Oil & Gas Co. No. 50 Osage, SW NE SW section 15-23-12, location; Lewis Production Co. & Texas Co. No. 7 Osage, SE cor. section 17-24-7, rig; Wolverine Oil Co. and others No. 17 North Avant Unit, NE NE SE section 31-24-12, location; same operator's No. 43 North Avant Unit, SW SE NE section 31-24-12, location.

Noble County

Shell Petroleum Corp. No. 1 William A. Moelling, C SW NW section 31-21-2w, Noble County wildcat between the Lucien field and the town of Lucien, near the Garfield County line, was completed for an estimated potential of 4,800 bbls. of oil. It will flow at the rate of 500 bbls. a day until the 15,000 bbls. allowed discovery wells is produced. It then will be pinched to 100 bbls. per day. Top of Layton sand was 4,190 feet; Oswego, 4,715 feet; Mississippi, 5,135 feet; Chattanooga shale, 5,218 feet; Misener sand, 5,273 feet; Viola lime, 5,278 feet; Simpson dense, 5,315 feet; Dolomite, 5,338 feet; first Wilcox sand, 5,373 feet; total depth, 5,389 feet. It flowed 1,815 bbls. of oil in nine hours.

Cleveland County

Anderson-Prichard Oil Corp. No. 1 State, SW SW SE section 16-10-2w, Moore pool, Cleveland County, made potential of 24,610 bbls. of oil and was completed. Top of second Wilcox sand, the producing horizon, was 7,210 feet; total depth, 7,254½ feet. It flowed 1,495 bbls. of oil in 24 hours, pinched, before completing for potential as agreed to by offset owners. Production was accompanied by a large volume of gas.

Denver Producing and Refining Co. and others No. 1 Keller, NW NW NE section 34-10-2w, southeast extension of the Moore field, topped second Wilcox sand at 7,380 feet, was bottomed at 7,409 feet, and flowed 165 bbls. of oil in 24 hours, with 28 per cent water. It was plugged back to 7,312 feet and acidized.

Garvin County

Two wells were completed in the Garvin County sector of the Tussy pool. Carter Oil Co. No. 2 Ivey, C NW SW SW section 33-1-n-3w, had sand at 2,363-2,412 feet; total depth, 2,467 feet. It swabbed 302 bbls. of oil in the first 24 hours, pumped 185 bbls. in 24 hours and was completed.

Winkler & McQueen No. 3 Davis, SW SE SE section 32-1n-3w, had broken sand at 2,700-07 feet; sand and shale, 2,709-31 feet; oil sand, 2,731-35 feet; total depth, 2,737 feet in lime; pumped 40 bbls. of oil in 24 hours, completed.

Carter Oil Co. No. 3 Ivey, NE SW SW section 33-1n-3w, was skidding derrick and tools on location.

Carter County

Gulf Oil Corp. No. 8 W. B. Johnson, C SW SW section 28-2s-3w, second deep well in the Fox field, Carter County, failed to find the pay and was abandoned at 7,497 feet, total depth. Hunton lime at 7,361-7,497 feet tested a small amount of salt water. Shooting and acidizing failed to obtain results, no oil showing. This deep test was drilled as a result of the Carter Oil Co. and others deep pay strike in the Fox field completed as a good producer earlier in the year.

Samedan Oil Co. No. 4 Eaves, NE SW NE section 6-2s-2w, had pay sand at 1,480-1,503 feet; total depth, 2,553 feet; plugged back to 1,536 feet; pumped 35 bbls. of oil in 24 hours and was completed.

Kewanee Oil & Gas Co. No. 8 Ferguson, NE SE NW section 6-4s-3w, was a location. Samedan Oil Co. No. 2 Higgins, SW SW NE section 7-2s-2w, an old well, was derrick and pits, preparatory to deepening.

Marshall County

Levelle Coal Co. No. 10 Brent, SE NE SE section 1-8s-5e, Marshall County, had a show of oil and gas in sand at 502-13 feet, but was dry and abandoned at 545 feet, total depth, in shale.

Creek County

One new oil well was completed in Creek County. Mahaboc Oil Co. No. 1 Ashe, SE SW NW section 23-18-8, had Burgess pay at 3,190-3,207 feet, total depth, and pumped 25 bbls. of oil and 12 bbls. of water in 24 hours.

M. S. Hughes No. 4 Flinchum, SE NW SW section 11-19-9, an old well, was deepened from 2,158 feet to Burgess sand at 2,382-91 feet, total depth, flowed 52½ bbls. of oil in the first 24 hours and was recompleted.

First reports of new work in Creek County: Sinclair Prairie Oil Co. No. 5 Jones, NE SW NW section 4-17-7, old well, cleaning out at 2,627 feet; Pure Oil Co. No. 2 Richards, SW SW NE section 4-17-7, old well, running 5⅜-inch casing at 2,660 feet; Sinclair Prairie Oil Co. No. 1 fee, SE SW SW section 24-17-7, rigging up machine; Indo Oil Co. No. 1-A Burgess, NE SE SE section 25-18-10, machine on ground; Johnson Oil & Refining Co. No. 3 Flinchum, SW NE SW section 11-19-9, rigging up machine; Doak & Hughes No. 1 Hodem, SW SE NW section 11-19-9, building rig.

Pawnee County

Bay Oil Corp. No. 1 Veetho, SE SE NW section 14-20-7, new Pawnee County test, was drilling at 705 feet.

Kay County

Kansas-Oklahoma Oil & Gas Co. No. 1-A Wolfe, NW NE SW section 6-28-1e, an old Kay County well, was deepened from 1,220 feet to sand at 3,200-37 feet, total depth, and was dry and aban-

(Continued on Page 315)

Rocky Mountain Area

By
T. R. INGRAM

OPEN DAKOTA SAND POOL IN YELLOWSTONE CO. MONTANA

DENVER, Colo., Dec. 28.—Phillips Petroleum Co. and the Anderson-Kerr Drilling Co. will make a Tertiary test in Moffat County, Colorado, 20 miles southwest of the Mountain Fuel Supply Co. discovery at Powder Wash. The South Park Oil Co. No. 1 Lemar, in Park County, had a good show of gas. There were no completions in Colorado.

The Stock Oil Co. No. 1 Griffin, on the Garland dome, Wyoming, was completed in the Amsden and Madison for estimated 400 bbls. a day. The Ohio Oil Co. will test the Tensleep at Rock River. This company's wildcat in Goshen County struck the granite and was abandoned at 3,052 feet with important sections found missing.

There were two completions in Cut Bank, in Montana, and R. C. Tarrant brought in a discovery on the Mosser dome in Yellowstone County, which pumped 100 bbls. in 18 hours. One small completion was reported in Kevin-Sunburst field.

NEW MEXICO

The Continental Oil Co. No. 1 Farney A, wildcat in section 5-23-36, Lea County, looked like the opener of a new pool 2 miles northeast of Henry townsite. Seven-inch casing was set at 3,694 feet; 2½-inch tubing at 3,758 feet, 2 feet off bottom, and it began flowing when swabbed in. It flowed at the rate of 38 bbls. an hour through three-fourths inch tubing choke for 10 hours, and was shut in for storage. Nearest production is in the Henry pool 2½ miles southeast. Atlantic Refining Co., the California Co. and Stanolind Oil & Gas Co. also are interested in the Farney discovery well.

Continental Oil Co. No. 1 Eaves B, C SW NE section 30-26-37, extended the Eaves area in southeastern Lea County one location south. It topped pay at 3,197 feet and was bottomed at 3,213 feet. Initial production was at the rate of 10 bbls. of oil per hour through three-fourths inch choke.

In the Maljamar pool, Maljamar Oil & Gas Co. No. 7 Baish, C SE NW section 21-17-32, flowed 80 bbls. of oil a day through casing after shooting. Production was from pay topped at 2,350 feet; total depth, 2,355 feet.

A large gasser was completed in the Jal pool at Continental Oil Co. No. 1-A-24 Sholes, C SE SE section 24-25-36. It produced 23,187,000 feet of dry gas after plugging back to 2,980 feet from 3,396 feet, total depth, where it had 1,800 feet of sulfur water in the hole. Top of gas pay was 2,921 feet.

In the Monument area, Amerada Petroleum Corp. No. 1 Adkins, C SW SW section 5-20-37, flowed 988 bbls. of oil naturally in 14 hours through 1-inch choke on tubing. It had best pay at 3,821-41 feet; total depth, 3,880 feet. Same operator's No. 5 Andrews, C SW NW section 12-20-36, was acidized with 2,000 gallons and swabbed 42 bbls. of oil in three hours. It was acidized with 2,000 gallons, and produced 141 bbls. of oil on gas lift and through choke on tubing, with 8 per cent basic sediment and water. It topped best pay at 3,842 feet and was bottomed at 3,890 feet. Empire Oil & Refining Co. No. 3 Laughlin, C SE SE section 5-20-37, topped pay at 3,820 feet; total depth, 3,895 feet, and flowed 119 bbls. of oil in six hours through 1-inch choke, with 2,250,000 feet of gas. Gulf Oil Corp. No. 2 Love, C SE SE section 32-19-37, had pay at 3,815 feet, total depth 3,898 feet, and after two acid treatments flowed 209 bbls. of oil through one-half inch tubing choke in 19 hours.

Three wells in the Eunice area were completed. Gulf Oil Corp. No. 2 Bell-State D, C SW SW section 6-21-36, flowed 268 bbls. of oil through open tubing in eight hours. It topped pay at 3,815 feet, was bottomed at 3,888 feet and acidized with 3,000 gallons. Same operator's No. 3 Orcutt C, C SW NE section 6-21-36, topped pay at 3,760 feet; total depth, 3,862 feet; acidized with 3,000 gallons, and flowed 165 bbls. of oil in eight hours through tubing. Humble Oil & Refining No. 7 State Aggies, C NW NE section 31-20-37, flowed at the rate of 11 bbls. of oil an hour through tubing after acid treatment. Pay was topped at 3,780 feet; total depth, 3,835 feet.

In the Sims area, Skelly Oil Co. No. 1 G. W. Sims, section 10-23-37, topped pay at 3,520 feet, was bottomed at 3,635 feet, and flowed 10 bbls. of oil an hour for 10 hours. It was shot, and flowed 150 bbls. of oil in eight hours through tubing choke.

One Eddy County well was completed. It was Republic Production Co. No. 6 Russell, SW NE NW section 18-17-31. First pay was topped at 3,480 feet, and total depth was 3,535 feet. It was acidized with 1,000 gallons, and pumped 20 bbls. of oil a day. After reacidizing with 2,000 gallons, it pumped 50 bbls. of oil in 12 hours and pumped off.

Monument Area

Skelly Oil Co. No. 2 State F, C SW SE sec. 17-20-37. Cellar and pits.
Phillips Pet. Co. and Anderson-Prichard Oil Corp. No. 1 Hobbs, C NE SW sec. 18-20-37. T.D. 3,870 ft.; acidized; shut in for storage.
Continental Oil Co. No. 1 Sanderson A, C E half NE NE sec. 10-20-36. T.D. 3,900 ft.; testing.
Continental Oil Co. No. 2 Sanderson A, C N half NW SE sec. 11-20-36. Drlg. 3,672 ft.
Amerada Pet. Corp. No. 7 State T, C NW SW sec. 28-19-37. T.D. 3,810 ft.; set 6⅝-in. csg.
Stanolind O. & G. Co. No. 1 Gillully, C SW SW sec. 8-20-37. Drlg. 3,708 ft.
Amerada Pet. Corp. No. 6 State T, C NW NE sec. 20-19-37. T.D. 4,000 ft.; testing.
Ohio Oil Co. No. 6 Barber, C NW SW sec. 6-20-37. T.D. 3,825 ft.; set 7-in. csg.
Anderson-Prichard Oil Corp. No. 5 Britt, C NE SW sec. 7-20-37. T.D. 3,857 ft.; testing.
Anderson-Prichard Oil Corp. No. 6 Britt, C SE SW sec. 7-20-37. T.D. 3,800 ft.; set 7-in. csg.
Gulf Oil Corp. No. 1 Graham-State G, C SW SE sec. 17-19-37. T.D. 3,995 ft.; testing after acid.
Ohio Oil Co. No. 7 Barber, C SW NW sec. 5-20-37. T.D. 3,796 ft.; set 7-in. csg.
Anderson-Prichard Oil Corp. No. 1 Britt B, C SE SW sec. 5-20-37. T.D. 3,700 ft.; set 7-in. csg.
Continental Oil Co. No. 1 Britt B, C NE NW sec. 8-20-37. T.D. 2,323 ft.; set 7⅝-in. csg.
Ennisbrook Oil Corp. No. 1 Wulff, NW cor. sec. 17-20-37. Drlg. 2,643 ft.
Phillips Pet. Corp. No. 1 Patsy, C NW NE sec. 18-20-37. Rig.
Humble O. & R. Co. No. 1 State E, C NW SW sec. 21-19-37. T.D. 3,985 ft.; testing.
Gulf Oil Corp. No. 1 Hatchett, C NW SW sec. 33-19-37. Drlg. 3,872 ft.
Skelly Oil Co. No. 1 Van Etten, C NW SW sec. 9-20-37. Drlg. 3,220 ft.
Texas Co. No. 4 Cooper, C SE NE sec. 5-20-37. T.D. 3,760 ft.; set 7-in. csg.
Amerada Pet. Corp. No. 3 State T, C SE NW sec. 25-19-36. Drlg. 3,861 ft.
Humble O. & R. Co. No. 2 Laughlin, C SW SW sec. 4-20-37. Cellar and pits.
Gulf Oil Corp. No. 2 Kutter A, C NW SE sec. 20-19-37. T.D. 1,400 ft.; set csg.
Amerada Pet. Corp. No. 1 Larsen, C SE SW sec. 32-19-37. T.D. 205 ft.; set 12½-in. csg.
Stanolind O. & G. Co. No. 2 Gillully, C NW NE sec. 21-20-37. T.D. 295 ft.; W.O.C.
Amerada Pet. Corp. No. 1 Byrd, C NW NE sec. 12-20-36. R.U.R.
Amerada Pet. Corp. No. 2 Byrd, C SW NE sec. 12-20-36. Bldg. derrick.
Repollo Oil Co. No. 2-A Bordages, sec. 21-19-37. T.D. 3,966 ft.; testing.
Barnsdall Oil Co. No. 6 Cooper, sec. 7-20-37. Bldg. drk.
Empire O. & R. Co. No. 4 Laughlin, sec. 8-20-37. Cellar and pits.
Ohio Oil Co. No. 8 Barber, sec. 5-20-37. Cellar and pits.
Ohio Oil Co. No. 1 Laughlin, sec. 9-20-37. Bldg. derrick.

Eunice Area

Shell Pet. Corp. No. 2 State A, NE cor. sec. 12-21-35. T.D. 3,891 ft.; testing.
Gulf Oil Corp. No. 4 Orcutt C, C SE NW sec. 6-21-36. Drlg. 2,930 ft.
Amerada Pet. Corp. No. 4 Houston, C SW NE sec. 7-21-36. Drlg. 3,422 ft.
Gulf Oil Corp. No. 5 Orcutt C, C SE SE sec. 36-20-36. Drlg. 3,732 ft.
Getty Oil Corp. No. 1 State D, C SE NE sec. 32-20-37. T.D. 3,860 ft.; testing.
Skelly Oil Co. No. 1 State G, C NW SE sec. 30-20-37. Drlg. 3,285 ft.
Shell Pet. Corp. No. 2 State J, C SW SE sec. 32-20-37. T.D. 3,400 ft.; S.D.
Continental Oil Co. No. 17-B-4 Meyer, C NE NE sec. 4-21-36. T.D. 3,738 ft.; to set csg.
Shell Pet. Corp. No. 2 State G, C NW NW sec. 6-21-36. Drlg. 3,704 ft.
Gulf Oil Corp. No. 2 Molly Campbell, C NE SW sec. 7-21-36. T.D. 2,812 ft.; P.B. 2,149 ft.; W.O.C.
Two States & Southern Pet. Ex. No. 1 McQuatters, C NW SE sec. 11-21-36. Cellar and pits.
Two States & Southern Pet. Ex. No. 2 McQuatters, C SE NE sec. 11-21-36. Drlg. 2,256 ft.
Humble O. & R. Co. No. 8 Knox, C NE SE sec. 10-21-36. Drlg. 3,170 ft.
Gulf Oil Corp. No. 1 J. H. Daly, NE NE SW sec. 6-22-36. Drlg. 2,489 ft.
Shell Pet. Corp. No. 2 State K, C SE NE sec. 36-20-36. Drlg. 2,780 ft.
Atlantic Ref. Co. No. 1 State M, C NE SE sec. 36-20-36. Drlg. 305 ft.
Gulf Oil Corp. No. 2 Sunshine, C SE SW sec. 30-20-37. T.D. 1,673 ft.; W.O.C.
Empire O. & R. Co. No. 3 State F, C SE SE sec. 30-20-37. Drlg. 2,174 ft.
Sun Oil Co. No. 5 Adkins, C SE SE sec. 3-21-36. Drlg. 1,659 ft.
Texas Pacific Coal & Oil Co. No. 3 State A, Acct. 2, C SW NE sec. 8-22-36. T.D. 255 ft.; W.O.C.
Humble O. & R. Co. No. 8 State-Aggies, C NE NW sec. 31-20-37. T.D. 170 ft.; W.O.C.

Sims Area

Devonian Oil Co. No. 1 Christmas, NE NE SE sec. 28-22-37. T.D. 3,405 ft.; set 7-in. csg.
Skelly Oil Co. No. 1 R. R. Simms C, C SE SW sec. 3-23-37. T.D. 3,347 ft.; drlg. by bit.
Skelly Oil Co. No. 1 H. O. Simms D, C SE NW sec. 3-23-37. T.D. 3,523 ft.; testing.
Skelly Oil Co. No. 1 W. P. Simms B, C NW NE sec. 10-23-27. Drlg. 3,490 ft.
Empire O. & R. Co. No. 1 Walden, C SE NW sec. 21-22-37. T.D. 3,600 ft.; testing.
Penrose & Rowan No. 3 Cary, C SE NW sec. 22-22-37. T.D. 1,305 ft.; waiting on tools.
W. H. Street et al No. 1 Wood, C W½ SE NE NE sec. 22-22-37. Drlg. 1,420 ft.
Amon G. Carter No. 1 E. M. Elliott, sec. 22-22-37. T.D. 3,400 ft.; set 7-in. csg.
J. E. Farrell No. 1 Walden C, sec. 15-22-37. T.D. 3,502 ft.; fishing.
J. E. Farrell No. 1-A Walden, C SW NW sec. 15-22-37. T.D. 3,400 ft.; S.D.O.
Skelly Oil Co. No. 2 R. R. Simms, C NE SW sec. 3-23-37. T.D. 1,193 ft.; waiting on rig.
Skelly Oil Co. No. 3 Baker, C NE NW sec. 27-22-37. Drlg. 3,227 ft.

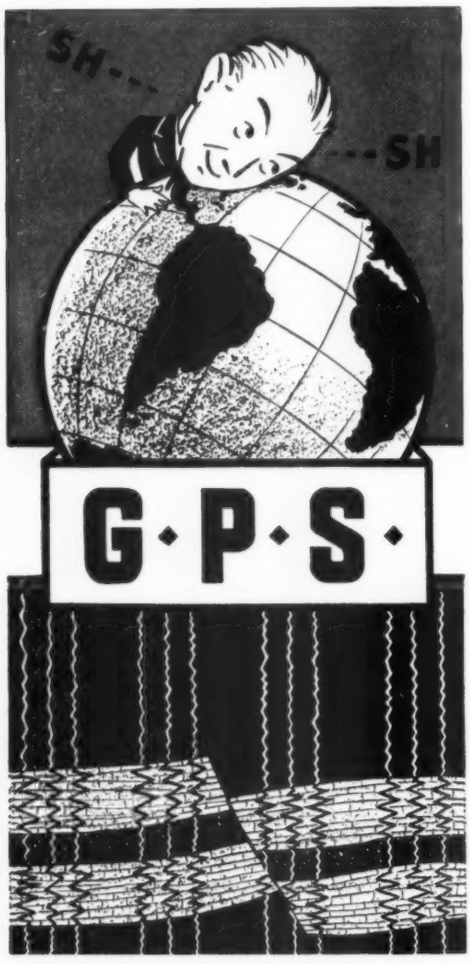
Cooper Area

Southern Oil Corp. No. 1 Gates, C SW NW sec. 23-24-36. T.D. 3,514 ft.; S.O. for orders.
Yingling Oil Co. No. 1-B-3 Vaughan, C SE NW sec. 3-24-36. Drlg. 1,350 ft.
Yingling Oil Co. No. 1-B-9 Vaughan, NE cor. sec. 9-24-36. T.D. 254 ft.; to set csg.
Shell Pet. Corp. No. 1 Guthrie, C SW SE sec. 34-23-36. Drlg. 1,940 ft.

Lea County—Miscellaneous

Continental Oil Co. No. 1 J. C. Farney A, C SW SE sec. 5-23-36. Wildcat; T.D. 3,760 ft.; set 7-in. csg.
Plains Prod. Co. No. 3 J. A. E. Knight, C SE SE sec. 21-24-27. T.D. 3,430 ft.; fishing.
Plains Prod. Co. No. 4 Knight, C SW SW sec. 22-24-37. Cellar and pits.
Eppenauer Drlg. Co. No. 1 Stuart, NE NW NE sec. 22-25-37. Drlg. 2,550 ft.
Rowan et al No. 1 Mattern, C SW SE sec. 8-22-37. T.D. 3,789 ft.; swabbing and testing; est 5 B.O. per hour.
C. & G. Oil Co. No. 1 E. Weir, C NE NE sec. 14-20-37. T.D. 4,075 ft.; P.B. 4,064 ft.; testing.
Williams & Cockburn No. 3 Miller, C SW SW sec. 23-17-32. T.D. 2,526 ft.; drlg. on collapsed casing.
Argo Royalty Co. No. 1 Lanehart, SW SE NE sec. 21-26-37. T.D. 3,782 ft.; P.B. to 3,572 ft.; est. 5,000,000 ft. gas.
Leonard No. 3 Lanehart, C NE NW sec. 21-25-37. Moving in material.
C. L. Carlock et al No. 1 Quincy-Ricker, C SE SE sec. 7-16-36. Wildcat; T.D. 4,145 ft.; S.D.
J. C. Clower No. 1 Turner, C SE SE sec. 29-21-37. T.D. 3,496 ft.; recementing csg.
Culberson-Irwin & Stovall No. 2 Stuart, NW SE SE sec. 20-25-37. T.D. 3,277 ft.; fishing.
Samedan Oil Co. No. 2 Hughes, C NW SE sec. 4-23-37. Drlg. 3,150 ft.
Brown & Reynolds No. 1 Parcell, C NW SE sec. 8-21-38. Wildcat; T.D. 3,160 ft.; fishing.
Baldridge et al No. 1 Blakely, C NW NE sec. 5-20-38. Wildcat; T.D. 2,815; standardizing.
Rushwold Oil Co. No. 1 Carter, C NW NE sec. 30-20-39. Wildcat; drlg. 3,115 ft.
Texas Co. No. 2 Sheppard A, C SW NW sec. 6-26-37. T.D. 3,150 ft.; P.B. to 3,017 ft.; to acidize.
Maxwell, Crandall & Osmond No. 1 Lane-State, C SW NW sec. 32-10-34. Wildcat; drlg. 4,030 ft.
Continental Oil Co. No. 1 Rex William A, C SW SW sec. 27-23-35. Wildcat; T.D. 4,088 ft.; to test.
Texas Co. No. 1 Black, C SW NW sec. 21-24-37. Drlg. 3,385 ft.
Magnolia Pet. Co. No. 3 Carson, C SW SW sec. 28-21-37. T.D. 3,625 ft.; S.D.

Tide Water Oil Co. No. 1 Coates B, C NW NW sec. 21-25-37. T.D. 3,077 ft.; P.B. 3,054 ft.; to shoot.
Amon G. Carter No. 2 Elliott, C NE NW sec. 22-22-37. Drlg. 2,105 ft.
Magnolia Pet. Co. No. 1 State G, NW NW NE sec. 24-17-34. Drlg. 3,450 ft.
Empire O. & R. Co. and Repollo Oil Co. No. 1 Brunson, NW NW SE sec. 4-22-37. Drlg. 2,860 ft.
Anderson-Prichard Oil Corp. No. 2 Carlson, C SW NW sec. 21-25-37. Drlg. 2,515 ft.
Shell Pet. Corp. No. 1 State T, C SE NE sec. 34-20-35. Wildcat; drlg. 3,549 ft.
Getty Oil Co. No. 2 Hardy, C SW SE sec. 20-21-37. T.D. 3,660; to set csg.
Texas Co. No. 1 V. M. Henderson, SE SE NE sec. 30-21-37. Drlg. 3,382 ft.
Getty Oil Co. No. 1 Etz, C NE NE sec. 12-21-32. Wildcat; T.D. 1,015 ft.; fishing.
Culberson-Irwin & Stovall No. 3 Stuart, NE SE SW sec. 10-25-37. Cellar and pits.
Continental Oil Co. No. 1 Wantz, C SW SW sec. 21-21-37. R.U.R.
Maljamar Oil & Gas Co. No. 8 Balsh, C NW SW sec. 21-17-32. Loc.
Mid-Continent Pet. Corp. No. 1 Greer, sec. 21-22-36. Loc.
Ohio Oil Co. No. 5 State-McDonald, sec. 16-22-36. Bldg. derrick.
Stanolind O. & G. Co. No. 1 Byers, sec. 22-24-37. Loc.
Texas Co. No. 1 Alexander, sec. 5-21-37. Cellar and pits.
Repollo Oil Co. No. 2 Boyd, sec. 23-22-37. Drlg. 3,665 ft.
Repollo Oil Co. No. 1 York, sec. 20-21-37. Drlg. 3,824 ft.



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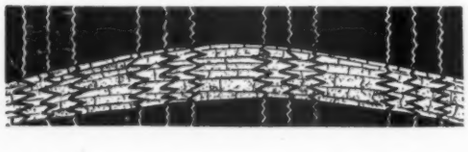
GEOPHYSICAL PETROLEUM SURVEYS, Inc.
GULF STATES BUILDING DALLAS, TEXAS



Chaves County

Elliott et al No. 1 State, sec. 16-8-23. Drlg. 350 ft.

Eddy County

Clint Murchison et al No. 1 State A, C NE SW sec. 16-17-31. Drlg. 2,950 ft.
Barnsdall Oil Co. No. 4 Dodd, C SE SE sec. 22-17-29. T.D. 2,803 ft.; set 6⅝-in. csg.
Fred Brainard No. 1 Berry, C E½ NW NW sec. 23-17-27. T.D. 1,729 ft.; S.D.
Tignor-Etz & Keys No. 5 Keys A, C E½ SW SW sec. 10-17-28. Drlg. 1,805 ft.
Etz Bros. No. 3 State, sec. 16-17-30. T.D. 3,252 ft.; acidized.
Hammond et al No. 1 State, SW SE SW sec. 15-27-28. T.D. 1,967 ft.; est. 10 bbls. oil per day.
McGinley & Harwell No. 7 Mann, SW cor. sec. 4-18-27. Drlg. 1,230 ft.
Premier Pet. Co. No. 1 McIntyre G, NW NW NE sec. 21-17-30. Drlg. 2,750 ft.
Flynn, Welch & Yates No. 75 State, C E½ SE SE sec. 10-19-28. Drlg. 1,350 ft.
Flynn, Welch & Yates No. 3 Gissler, SW SE SW sec. 14-17-30. Drlg. 1,896 ft.
Flint Prod. Co. No. 1 Flint, SE SW SE sec. 14-17-30. Drlg. 1,886 ft.
Adams and others No. 1 Page, sec. 15-21-28. Wildcat; machine.

Harding County

Kahay No. 1 Dae Daca, C sec. 19-20n-31e. T.D. 1,702 ft. S.D.
Clyde B. Neill No. 1 Foster, C NW NW sec. 27-21-30. S.D. 700 ft.

De Baca County

Mid-Continent Engineering Corp. No. 1 State, C NW SE sec. 27-4n-22e. T.D. 1,051 ft. in broken lime; S.D.
Maxwell, Crandall & Osmond No. 1 Williamson, C NW NW sec. 7-8s-36e. Wildcat; drlg. 3,882 ft.

Roosevelt County

Clovis Corp. No. 2 Wilmes, C SE NE sec. 17-2s-30e. Drlg. 1,160 ft.
Wirt Franklin and Flynn, Welch & Yates No. 1 Catts, C NW NW sec. 28-3n-30e. Drlg. 3,825 ft.

Union County

Superior Oil Corp. and Olson Drlg. Co. No. 1 J. H. Zurich, SE SW sec. 2-21-34e. T.D. 2,925 ft., in granite; S.D.

NORTHWEST NEW MEXICO

Bernalillo County

Norrins Realty Co., Inc., No. 2 North Albuquerque, SE NW NW sec. 19-11n-4e. Drlg. 2,900 ft. in hd. sd. with frequent sh. breaks.

McKinley County

S. Dysart No. 1 Bouten, NW NE sec. 14-14n-10w. T.D. 1,490 ft.; cmtd. 12½-in. 1,060 ft.

San Juan County

The Continental Oil Co. No. 46 Tribal, NW SW SW section 1-29n-19w, Rattlesnake field, an old well deepened from 787 feet, was completed at 890 feet for 25 bbls. of oil and 23 bbls. of water in 15 hours.

R. R. Burke No. 2 Govt., NW NW NE sec. 18-31n-13w. Drlg. 297 ft. sh.; 19¾-in. at 30 ft.; wtr. at 230 ft.
Continental Oil Co. No. 34 Tribal, C SW SW sec. 2-29n-19w. Cmtd. 5-in. at 863 ft.
Angel Peak Oil Co. No. 7 Govt., Lot 2, sec. 11-28-11w. Drlg. 1,060 ft.
Jack Amenda No. 4 Hart, NW NE SW sec. 25-30n-12w. Drlg. 1,465 ft.

COLORADO

Boulder County

Baker et al No. 3 McKenzie, NW NE NW sec. 21-1n-70w. Drlg. below 2,450 ft.

Jackson County

Colorado Oil Ref. Co. No. 1 North Park Coal Co., NW NW sec. 18-9n-78w. S.D. 2,700 ft.

Kiowa County

Gulf Oil Corp. No. 1 Riser-Union Pacific, C SW NE sec. 1-17s-50w. T.D. 3,925 ft.; rmg. at 3,725 ft.; to set 10¾-in.

LaPlata County

Detroit Oil Association No. 1, NW SW sec. 9-35n-12w. T.D. 3,397 ft.; fsg.
McGarr Pet. Co. No. 1 Pinon Mesa Land Co., CSL NE NE sec. 34-33n-12w. Cmtd. 6¼-in. at 3,450 ft.; D.D. to 3,680 ft.; S.D.

Las Animas County

Dividend Oil & Refrs., Inc., No. 1, W½ sec. 12-33s-66w. Spdg.
Garcia Corp. No. 1 McClung, NE NW SE sec. 19-33s-61. Drlg. 930 ft.

Lincoln County

Consolidated Smelting & Metals Co. No. 1 Hancock, NE NE SW sec. 7-17-62. T.D. 2,096 ft.; drlg. up bailer.

Moffat County

Location was released this week for an important wildcat on the Dry Mountain structure in Moffat County, 20 miles southwest of the Powder Wash structure, where the Mountain Fuel Supply Co. recently brought in an oil discovery in the Wasatch formation of Tertiary age, and the same distance southeast of the Hiawatha gas field. The well will be drilled by the Anderson-Kerr Drilling Co. and others on the Denise permit in the C SE SE section 19-9n-99w. The Phillips Petroleum Co. has a large interest in the operation. It will test sections of the Wasatch and Green River formations and due to nonconformity is expected to reach the Dakota series at around 2,500 feet. It will be drilled with cable tools and the operator is moving in and the county is building road to location.

The block was assembled by the old Midwest Refining Co., from which it passed to the Stanolind Oil & Gas Co. in the consolidation of those companies. It was later acquired by H. Leslie Parker, discoverer of the Big Muddy field, in Wyoming, after whom the town of Parkerton is named, and W. A. Myers, who promoted and drilled the discovery well on the Hiawatha dome. The Stanolind company retains a small working interest in the test. The structure is described in Bulletin 751-G of the U. S. Geological Survey, by Julian D. Sears. About 3 miles to the west of the structure at Marshall Springs there is a Dakota outcrop and there is an oil seep at the base of that formation.

Anderson-Kerr Drlg. Co. et al No. 1 Govt., C SE SE sec. 19-9n-99w. M.I.M. (first report).
Mountain Fuel Supply Co. No. 1 J. C. Donnell, C SE NE sec. 31-12n-97. Loc.
Mountain Fuel Supply Co. No. 1 Stewart, C SW SW sec. 32-12n-97w. R.U.
Mountain Fuel Supply Co. No. 1 Kuykendall, NE NE SE sec. 22-12n-100. T.D. 2,790 ft.; P.B. to 2,537 ft.; cmtd. 4½-in. at 2,495 ft.; to test oil sd.; drlg. plug.

Park County

The South Park Oil Co. No. 1 Lemar, on the

B-M-W ADMORE

Insert Pump Anchor

Patent No. 2,027,783

No Working Barrels
No Seating Nipples
No Mechanical Shoes
No Pulling of Tubing

Packs off and holds down directly in the tubing itself. Saves on sucker rods and other equipment where fluid level is high and well can be pumped above bottom. Complete data on request.

The B-M-W ADMORE INSERT PUMP ANCHOR is screwed directly onto the pump and replaces the conventional cup or mechanical hold-down. The pump is run in the usual way, with no special care required. When the desired setting position is reached, the slips are tripped by lifting and turning the rods, and the packer is set by the weight of the rods.

Principal B-M-W Products are obtainable at supply stores, including: ADMORE Insert Pump Anchors; NEILSON Tools (Safety Sucker Rod Hooks, Tubing Hooks, Rod Elevators, Sucker Rod Sockets, Etc.); BALLS and SEATS (made for every pumping service); ADMORE Liner Barrels; TEX TYPE Plunger Fittings and Valves; and COLLINS Belt Clamps.

BRADFORD MOTOR WORKS INC.
OIL WELL SUPPLIES
BRADFORD, PA. — TULSA, OKLA.
EXPORT OFFICE, 30 CHURCH ST., NEW YORK CITY

South Hartsel dome in the South Park district, had a show for 500,000 feet of gas at 3,220 feet. It is located 3 miles southeast of No. 1 State, which several months ago looked like a discovery when it had considerable oil and gas, but which is drilling ahead after casing off both. Last named recently took a core-barrel test to determine position of the beds and found them practically flat.

South Park Oil Co. No. 1 Lemar, NE NE SE sec. 34-11s-75. Drlg. 3,280 ft.; 10¾-in. at 3,270 ft.
South Park Oil Co. No. 1 State, SE NE SW sec. 16-11s-75w. Drlg. 5,570 ft.; 4¾-in. at 5,550 ft.

Pueblo County

Phillips Pet. Co. No. 1 Andover-Century, NE SW NW sec. 26-18s-65w. Drlg. 1,570 ft.

WYOMING

Albany County

Murphy Oil Co. No. 5 Holst, SE NE SE sec. 13-17n-77. Drlg. 3,085 ft.
Hal Blakeman No. 1 Chapple, C NE NW sec. 31-21-76 Drlg. 1,691 ft.
Murphy Oil Co. No. 6 Holst, NW NE SE sec. 13-17n-77. M.I. rot.

Big Horn County

The Stock Oil Co. has a completion on the Garland dome in its No. 1 Griffin, Lot 60, section 4-55n-97w, at a total depth of 4,200 feet. It is bottomed in the Madison lime and the 5-3/16-inch was cemented at 3,854 feet to produce from both that horizon and the Amsden. It was not gauged, but after a short swabbing test it was estimated at 400 bbls. a day. It flowed by heads when plug was drilled. It had oil and gas saturation in the Embar-Tensleep, topped at 3,551 feet, but no test of those horizons was made. The well is about 350 feet down structure from the same company's No. 1 Allen, the burning gas well. No. 1 Griffin was spudded in 1934 and was subsequently taken over by the Stock Oil Co. and rotary replaced cable tools.

Stock Oil Co. No. 1 Allen, Lot 52, sec. 32-46n-97. T.D. 3,825 ft.; on fire.
Stock Oil Co. No. 1-B Allen, Lot 52, sec. 32-46n-97. Drlg. 3,800 ft.
Ohio Oil Co. No. 1 Wiley, C NE NW sec. 25-56n-97. T.D. 5,275 ft.; cmtd. 7-in. at 5,250 ft.; drlg. plug.
Ohio Oil Co. No. 2 Smith, CWL NE SE sec. 32-56-97. T.D. 4,191 ft.; cmtd. 5¾-in. at 4,070 ft.; W.O.C.
Ohio Oil Co. No. 1 State, NE cor. Lot 38, sec. 36-46n-97 Drlg. 3,202 ft. in sh.
Taylor Oil Co. No. 1 Robinson, SW SW NW sec. 34-56n-97. Drlg. 3,030 ft.
Peay Oil Co. No. 1 Denjo Hr., 43-C, sec. 15-55n-87w. S.D. 3,998 ft.
Peter Evanoff et al No. 1 McAllister, NW NE SE sec. 9-55n-87. S.D. 3,015 ft.; will run 8⅝-in. and go to Madison.
J. W. Bales No. 1 Parker, C SW SW sec. 23-49n-89w. S.D. 1,000 ft.

Carbon County

The Ohio Oil Co. No. 7 Harrison & Cooper, an old well in the Rock River field, deepened to the Sundance, found water in that horizon at 3,414-20 feet, and is to be made into a test to the Tensleep which has not yet been drilled at Rock River. The well is located almost half a mile south of the nearest Sundance producer.

Ohio Oil Co.-California Co. No. 2 Kyle, C SE SE sec. 26-21n-79w. Loc.
Ohio Oil Co-California Co. No. 4 Union Pacific, C SW SW sec. 25-21n-79w. Loc.
Ohio Oil Co. No. 7 H.&C., C NW sec. 2-19-78. Drlg. 3,651 ft. in red beds.
Medicine Bow Oil Co. No. 1 Hintze-Govt., C NE SE sec. 18-22n-78. Drlg. 1,910 ft. in Sundance; 8⅝-in. cmtd. at 1,900 ft.
General Pet. Corp. No. 1 Union Pacific, SW NW sec. 19-83w. S.D.O. 5,557 ft.
Sinclair-Wyoming Oil Co. No. 10 Govt., SW SE NW sec. 7-26-89w. T.D. 5,883 ft.; cmtd. 7-in. at 3,863 ft.; prep. to test Tensleep which made 75 B.P.H. on D.S.T.

Converse County

Chadron-Osage Oil Co. No. 1 State, SW SW sec. 16-32n-69w. S.D. 3,050 ft.; many install rotary.
Wyoming Southern Oil Co. No. 2 Salisbury, NE NW SE sec. 27-32n-69w. Cmtd. surf. pipe at 30 ft.

Campbell County

C. J. Shearin et al No. 1 Rhodes, NE SE SW sec. 21-49n-74. S.D. 191 ft.

Fremont County

C. E. Nelson No. 2 Enos, SW NE SW sec. 27-3n-1w. Drlg. 990 ft.
Tropic Oil Co. No. 1 Govt., C SE SW sec. 34-27n-90w. Drlg. 3,120 ft.; 4¾-in. 2,080 ft.
Sinclair-Wyoming Oil Co. No. 2-C Muskrat, NE SW SW sec. 1-33n-92w. T.D. 7,293 ft.; fsg. bailer.; H.F. oil.

Goshen County

The Ohio Oil Co. No. 1 Waggoner, C NE NE section 14-28n-63w, on the Jay Elm (Rawhide) structure, just 15 miles west of the Nebraska boundary, which started in the Tertiary to test the lower Cretaceous and possibly the Sundance, encountered the granite and was abandoned at 3,052 feet without having any shows of oil or gas. It went out of the Tertiary into the red beds at around 1,900 feet and found no Cretaceous or intervening beds. The well was located on a seismograph survey and it is possible, as in the Byrd-Frost test in Nebraska and the Indian Territory test in Yuma County, Colorado, that the reflections indicating a structure were on the granite instead of sedimentary rocks.

Laramie County

Amerada Pet. Corp. No. 1 Morton, C SW SW sec. 13-13n-68. Drlg. 7,365 ft.

Lincoln County

The Place Oil Co. No. 1 L. W. Davis, drilling in the La Barge area, is becoming an important test and should it develop production will extend the La Barge field half a mile to the south. It set the 12½-inch at 301 feet for a water shutoff and is drilling ahead in a 10-inch hole. It is running 30 feet higher than the Rainbow well in the NW cor. section 15-26-113, which in 1927 showed for a big gasser at 1,228 feet.

H. M. Eilers et al No. 5 Govt., NE SE SW sec. 32-19n-116w. Drlg. 490 ft.
Place Oil Co. No. 1 Davis per., SE cor. sec. 9-26n-113. Drlg. 360 ft.
Senrab Oil Co. No. 3 Govt., CSL SE NW sec. 10-36n-113w. S.D. 1,020 ft.

Natrona County

Western Producers, Inc., No. 1 Govt., NW SW SE sec. 5-39n-78. Drlg. 500 ft.

Niobrara County

The Ohio Oil Co. No. 4 Agnes Rohlf, C SW NE section 32-36-65, an outside well on the north flank of Lance Creek, which showed for 40 bbls. a day when reported a completion two weeks ago, has about doubled its production through working over and running wall scraper, and swabbed 87 bbls. in 24 hours.

The Argo Oil Co. No. 3 Ford, a first report, will be an outside well on the north on Lusk Royalty Co. land, a north offset to the Ohio Oil Co. No. 5 Putnam and an east offset to Ohio No. 3 Rohlf.

Argo Oil Co. No. 3 Ford, SW SW NW sec. 33-36n-65w Bldg. rig; (first report).
Bay-Elwell No. 1 Joss, C SE SE NW sec. 1-34n-66w. T.D. 2,200 ft.; rng. 8⅝-in.
Continental Oil Co. No. 2 Schuricht, SE SW NE sec. 6-35n-65. T.D. 4,068 ft.; P.B. to 4,000 ft.; swbg. and tstg.
Continental Oil Co. No. 5-A Schuricht, C NW SW sec. 5-35n-65w. R.U.R.
Holly Dev. Co. No. 1 Novick, NE SE SW sec. 6-35n-65 T.D. 3,951 ft.; tools fell back in hole; fsg.
Lewis Gokel No. 1, NE SE NW sec. 31-35n-62w. Drlg. 970 ft.
J. M. Huber Corp. No. 2 Jose, NE NE SW sec. 6-35n-65. Drlg. 3,868 ft.
Ohio Oil Co. No. 5 Leo OPC-16, NW NW SW sec. 35-36n-65w. R.U.R.
Ohio Oil Co. No. 9 Lamb, C SE NW sec. 5-35n-65w. T.D. 199 ft.; W.O.C.
Riggs Oil Co. No. 2 Spaugh, SE SW SW sec. 32-34n-65w. S.D. 1,092 ft.; for winter.
Chester Oil Co. No. 1 fee, NE NE NE sec. 14-39n-61. Drlg. 1,011 ft.

Park County

General Pet. Corp. No. 1 Govt., NW NW NW sec. 33-47-100. Drlg. in red beds 4,600 ft.
Resolute Oil Co. No. 1 State, C NW SW sec. 16-57-101w. T.D. 8,460 ft.; bldg. new rig.

Platte County

Dividend O. & R. Co., Inc., No. 1, CSL NW SW sec. 17-24n-66. Drlg. 1,900 ft.

Sheridan County

Beaver Creek Oil Co. No. 1 Allison, SW SE sec. 15-55-85. S.D. 3,200 ft.

MONTANA

Big Horn County

Daniels Pet. Co. No. 1 May, C SE SE sec. 13-1s-33e. Drlg. 3,785 ft. in r.b.

Cascade County

C. Leonard Smith No. 1-A Smith-Schwingle, NE NE SW sec. 14-22n-2e. Drlg. 1,760 ft.

Carbon County

East Bridge O. & G. Co. No. 1, CSL SE SE sec. 23-6n-23e. Drlg. 1,555 ft.
Ohio Oil Co. No. 1 Northern Pacific, SE NE SW sec. 11-7s-21. T.D. 5,772 ft.; cmtd. 4¾-in. at 5,542 ft.; ran 406 ft. 3-in. lnr.; tstg.
Miracle Oil Co. No. 2 Blue Creek, CWL NE NE sec. 3-6s-23e. Drlg. 1,160 ft. in Colo. sh.; (formerly Round Butte Oil Co.).
Henderson Prod. Co. No. 1-H-11 Elk 11, SE SE NW sec. 35-9s-23e. S.D. 810 ft.; weather.

Fallon County

Montana-Dakota Utilities No. 2 Warren No. 1 Unit 5, C SW sec. 23-8n-59e. In red beds 6,124 ft.
Montana-Dakota Utilities Co. No. 3 Smith No. 1 Unit 8, C SE NW sec. 8-4n-62e. Cg. 6,694 ft.

Fergus County

Judith Op. Co. No. 2 Govt., CWL NW NE sec. 35-22n-17e. Drlg. 3,196 ft.
Emmons et al No. 4 Govt., SW cor. sec. 3-21n-18e. Drlg 445 ft.

Pondera County

Clinch Pet., Ltd., No. 1 Holan, NW SW NW sec. 12-23s-6w. T.D. 2,200 ft.; drlg. cmt. 2,010 ft.

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CLEVELANDS

K. P. Hardee No. 1 Hughes, NW NE NW sec. 12-30n-4w. T.D. 2,494 ft.; fsg.
Kirk Oil Co. No. 1 Kellogg, SE NW NE sec. 31-28n-4w. T.D. 2,130 ft.; drlg. plug.

Glacier County

There were two completions and one new operation in the Cut Bank field.

The Glacier Production Co. (formerly Montana Power Gas Co.) No. 1 Wallace, C NE SE section 5-32n-5w, was completed at 2,937 feet and swabbed 86 bbls. first 24 hours. It is making a little water. The Sunburst was at 2,860-75 feet with a show of oil at 2,868 feet. The Cut Bank was at 2,890-2,932 feet and the pay at 2,920-32 feet.

Same company's No. 1 Hope Unit, NW cor. SE section 8-34n-5w, was completed for 9,500,000 feet of gas at 2,688 feet. The Moulton sand at 2,490-2,600 feet was dry and the Sunburst was at 2,620-40 feet with a show of gas at 2,634 feet. The Cut Bank was at 2,645-87 feet with the pay at 2,673-87 feet.

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A. B. Cobb No. 2 All.-115, SE NE SE sec. 31-33n-5w. Cmtd. 7-in. 2,793 ft.; W.O.C.
Drumheller Reservation Synd. No. 1 Tarrant, C SW SW sec. 21-22n-6w. Drlg. 3,010 ft.
Glacier Prod. Co. No. 1 Williams, C SW SE sec. 21-33n-5w. Cellar; (first report).
Wm. Hanlon, Agt., No. 1 All.-127, C SE NE sec. 12-32n-6w. Drlg. 2,170 ft.
Hannah-Porter Co. No. 2 All.-130, C NE SW sec. 6-32n-5w. Drlg. 1,200 ft.; 10¾-in. 613 ft.
B. V. Hole No. 2 All.-124, C SW SE sec. 1-32n-6w. Drlg 2,930 ft.
Montana-Dakota Oil Co. No. 1 Tribal 136, C NE NE sec. 15-34n-6w. Drlg. 500 ft.
Montana Power Gas Co. No. 1 Federal Land Bank, C SW SW sec. 30-34n-5w. Drlg. 1,925 ft.
Pardee Drlg. Co. No. 2 Morrison, CEL NE SE sec. 24-33n-6w. Drlg. 2,785 ft.
Vera Johnson No. 1 Tribal-118, C SW SW sec. 1-32n-6w. S.D. 2,900 ft. for 8¼-in.
Dan Whetstone No. 2 Tribal-117, C NE SW sec. 36-33n-6w. Drlg. 1,620 ft.
A. E. Wilkinson No. 2 All.-111, C SW SW sec. 31-33n-4w. Drlg. 1,900 ft.
A. E. Wilkinson No. 2 Tribal-126, NW NW NW sec. 7-32n-5w. T.D. 2,770 ft.; P.B. to 2,700 ft.; to drill by.

Sheridan County

Cheyenne O. & G. Co. No. 1 Olson, SE SE SE sec. 14-35n-53e. S.D. 2,615 ft.; 500,000 ft. of gas 1,050 ft. and 500,000 ft. at 1,305 ft.; S.O. with 12½-in.

Toole County

One well was completed in the Kevin-Sunburst field in A. E. Crumley No. 11 Shaw, SE NW NE section 35-36n-2w, which is estimated at 20 bbls. per day before being acidized. Total depth is 1,587 feet and the Sunburst was at 1,569-85 feet.

Agen & Goeddertz No. 4 State, NE NE SE sec. 16-35n-3w. Drlg. 1,603 ft.
Big West Oil Co. No. 5 Dahlquist, NW SW NE sec. 21-35n-3w. Drlg. 1,400 ft.
Bryant Bros. No. 1 Lashbaugh, NW SE NW sec. 34-35n-2w. S.D. 850 ft.
W. M. Fulton No. 1 Thompson, NW SW NE sec. 28-35n-3w. S.D. 1,400 ft.
Kevin-Butte Synd. No. 1 Thompson, NE NE NW sec. 32-35n-3w. Drlg. 325 ft.
Ohio Oil Co. No. 4 Berg, C SW SW sec. 31-33n-1w. Drlg. 975 ft.
Ogden-Kevin Co. No. 7 Zachot, SE SW NW sec. 20-35n-1w. S.D. 900 ft.
Wm. S. McKnight No. 1 Gunderson, SW SE NW sec. 9-35n-2w. S.D. 800 ft.
Shaver Oil Co. No. 1 Schaffer, SW SE NE sec. 11-34n-2w. S.D. 1,473 ft.; will acidize; Ellis-Madison 1,470 ft.; S.O.
Welch Bros. No. 2 Larum, SW SW NW sec. 25-35n-3w. S.D. 1,658 ft.; (cor.).
Watson et al No. 2 Leach, SE NE NE sec. 31-35n-3w. R.U.

Yellowstone County

Montana has a discovery in R. C. Tarrant No. 1 Sayre, NW NW SE section 26-3s-24e, a wildcat on the Mosser dome, 18 miles southwest of Billings and 24 miles north of the Elk Basin field on the Wyoming-Montana boundary. It has the Dakota at 1,010-36 feet and was still in sand when drilling stopped. The principal saturation was at 1,020-36 feet. It pumped 100 bbls. in 18 hours and at a later period averaged 8 bbls. an hour for eight hours. Oil stood 600 feet in the hole and after being pumped down recovered that level in a few hours. The gravity of the oil was reported 24 degrees, but this may be an error as the Dakota usually shows a high gravity crude. The well is located 860 feet south of Tarrant No. 1 Mosser, which had 500 feet of oil at 995-1,060 feet and looked good for 100 bbls. initial, but which was drowned out by water when it went a little deeper. It was then drilled on down to the Madison at 2,571 feet, total depth, where it was completed as a water well, making 15,000 bbls. a day. It is a small structure closed by a fault.

R. C. Tarrant No. 1 Harper, CEL SW NW sec. 4-3s-25e. Drlg. 1,065 ft. (first report).

UTAH

Daggett County

Mountain Fuel Supply Co. No. 1 Lauzur, CNL NW NW sec. 27-3n-24e. R.U.R.

Emery County

California Co.-Continental Oil Co. No. 1-A Palm, C NW NW sec. 27-23s-11e. Spdg. 91 ft.

Grand County

Columbia Crude Corp. No. 1 Rath, NW SW SW sec. 12-35s-20e. Drlg. 1,890 ft. in Paradox.
Utah Southern Oil Co. No. 1 Hyde, SE NW NW sec. 33-22s-22e. Drlg. 5,902 ft. in sh.

Utah County

Diamond Oil Co. No. 4 Govt., CSL SE NW sec. 16-3s-5e. T.D. 4,900 ft.; fsg. bit.

Summit County

Longwell Pet. Co. No. 1, SE SW SE sec. 35-3n-5e. T.D. 1,920 ft.; rng. 6⅝-in.

Gulf Coast Fields

(Continued from Page 297)

plugged back depth of 6,563 feet, through perforated casing made in the Frio sand from 6,532-38 feet. At this writing the well does not look very favorable and the casing may have to be perforated lower or the hole swabbed before it "kicks off." This is the third test to be drilled in the area, and is located about 3,500 feet from No. 2 Lawrence, which for a short time produced oil at 6,651-60 feet before going to salt water. According to geological markers, No. 1-A Lawrence is over 200 feet structurally higher than the abandoned hole, although the same sand was encountered about 50 feet higher.

To the northeast in the Turtle Bay field, Sun Oil Co. No. 3 Chambers, which missed the regular producing horizon at approximately 6,600 feet, cored broken sand and shale with an oil and gas odor at 6,886-6,914 feet, and on a 10-minute drill-stem test showed 1 thribble of gas-cut mud and 23 thribbles of salt water with no oil or gas. It is coring ahead in shale below 7,093 feet. Approximately 5,000 feet north of production, Stanolind Oil & Gas Co. is building roads for an interesting

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WORKING BARRELS

outpost test. It is No. 1 Iola White in the M. A. Carroll Survey.

In the Ace field, Peyton Brothers No. 1-B Kirby Lumber Co., located about 1,000 feet west of a dry hole drilled by the Alpha Petroleum Co., has cemented 5½-inch casing on bottom at 4,900 feet and preparations are being made to perforate the casing at 4,856 feet. Several drill-stem tests made below this depth have showed oil and salt water.

At the Bammel Prospect, Harris County, George Lawrence and others No. 1 Zappa, J. Farwell Survey, is shut down waiting for orders after an electrical coring test showed 8 ohms resistivity and 65 millivolts porosity from 6,206-26 feet.

In the Silsbee field, Hardin County, Republic Production Co. and Houston Oil Co. are preparing to test No. 2 Brooks bottomed in the Cockfield sand at 6,910 feet, with 7-inch casing cemented at 6,897 feet. It is northeast of No. 3 Brooks, completed last week in the same sand, approximately 35 feet deeper. On a 24-hour gauge through a quarter-inch choke, No. 3 Brooks flowed 275 bbls. of pipe line oil with tubing pressure 1,500 pounds and casing pressure 1,800 pounds.

At the Labelle Prospect, Jefferson County, Sun Oil Co. has moved in casing to No. 2 White and the hole, which is bottomed in 11 feet of oil sand at 8,217 feet, is being reamed preparatory to running casing for a production test. No. 2 White is located due west of No. 1 Hebert, abandoned below 8,600 feet after encountering numerous showings of oil and gas.

Another northeast extension to the Hasting field has apparently been made by Humble Oil & Refining Co. No. 1 Berkheiman, bottomed in oil sand at 6,080 feet and 7-inch casing is being cemented. Location is in a 7-acre tract in the B.B.B.&C. Survey.

West Texas Fields

(Continued from Page 300)

J. R. Phillips and others No. 1 Taylor, dry and abandoned, 3,124 feet. Sunray Oil Co. No. 2 Ferguson, 2,755-2,870 feet, acidized, 400 bbls. on pump. Texas Co. No. 6 Barrett, 3,145-3,253 feet, shot, 563 bbls. on pump. Warner Oil Co. No. 1 Reeves, dry and abandoned 2,995 feet.

Carson County

Empire Gas & Fuel Co. No. 1-E Magnolia fee, 2,993-3,100 feet, shot, 555 bbls. pumping. Humber Petroleum Co. No. 2-R Burnett, 2,220-2,595 feet, 23,020,000 feet gas. Skelly Oil Co. No. 81 Schafer, 2,948-3,095 feet, shot, 646 bbls. United Crude Oil Co. No. 5 Cooper, 3,005-3,105 feet, shot, 943 bbls. on pump.

Hutchinson County

McDaniel and others No. 1 Starnes, 3,085-3,120 feet, shot, 106 bbls. on pump. Skelly Oil Co. No. 4 Watkins, 2,875-2,972 feet, shot, 661 bbls. on pump. Turman Oil and Planins Oil Co. No. 8 Whittenburg, 2,800-60 feet, shot, 802 bbls. on pump. Walero Oil Co. No. 2 Haile, 3,035-82 feet, shot, 495 bbls. on pump.

Moore County

Texas Interstate Pipe Line Co. No. 1-28 Sneed, 2,520-3,057 feet, 6,264,000 feet gas.

Wheeler County

Elbar Oil Corp. No. 10 Noel, 2,400-90 feet, shot, 233 bbls. on pump. Palmer and others No. 2 Nelson, 2,085-2,210 feet, 50,943,000 feet gas. Skelly Oil Co. No. 1 Cullum, total depth 2,700 feet, shot 7,940,000 feet gas.

Kansas Fields

(Continued from Page 296)

section 12-23-14, was the only Coffey County completion. Top of Mississippi lime was 1,571 feet; total depth, 1,613 feet; it was acidized with 3,000 gallons and pumped 20 bbls. of oil in 24 hours.

Greenwood County

Ohio Oil Co. No. 7 Pixley, SE SW NW section 8-22-10, Greenwood County, topped lime at 2,387 feet; sand, 2,316 feet; total depth, 2,477 feet, and was dry and abandoned.

Sedgwick County

Shell Petroleum Corp. No. 1 Brown, SE SE SW section 15-26-2e, an old Sedgwick County well, was rigging up to deepen from 3,219 feet, total depth.

Barber County

Sinclair Prairie Oil Co. No. 1 Gentry, NE cor. section 1-33-15w, wildcat south of Deerhead in Barber County, perforated casing and shot at various depths, but ended up with water in the hole and was dry and abandoned. It topped Fort Riley at 2,420 feet; Topeka lime, 3,320 feet; Kansas City, 4,212 feet; Mississippi, 4,807 feet; Viola, 5,105 feet; Simpson, 5,235 feet; Wilcox sand, 5,252 feet; odor of oil, 5,269 feet; Siliceous lime, 5,331 feet; total depth, 5,529 feet; plugged back to 4,897 feet and acidized with no results; plugged back to 4,792 feet and began perforating and shooting operations, to no avail.

Marion County

Western Kansas Oil & Refining Co. and others No. 1 Hauser, SW cor. section 19-19-4, wildcat in Marion County, topped a lime at 2,300 feet; had Viola lime at 2,610-44 feet, total depth; water intruded and it was dry and abandoned.

Osborne County

Helmerich & Payne No. 1 Hittinger, C SE SE section 2-7-11w, was location for a wildcat southeast of Downs in northeastern Osborne County.

Kingman County

Shell Petroleum Corp. No. 1 A. M. McMichael, C W half W half SW section 12-27-10w, wildcat in northwestern Kingman County, was a cellar. It is between the Cunningham pool in Kingman County and the Lerado pool in Reno County.

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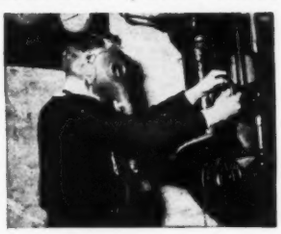

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Eastern Field Report

By STAFF CORRESPONDENT

23 NEW OIL AND GAS WELLS ALL OF ROUTINE CHARACTER

PITTSBURGH, Pa., Dec. 28.—Thirty-five operations were completed in the lower Eastern fields most of which were routine and included another Oriskany gas well in West Virginia. Twelve were dry holes, 14 gas wells, and 9 producers with an initial production of 119 bbls. Southwest Pennsylvania was active with seven completions.

SOUTHWEST PENNSYLVANIA

Two producers were completed in southwest Pennsylvania. In Amwell Township, Washington County, the South Penn Oil Co. completed No. 3 on the J. Q. Zimmerman farm in the Fifth sand at a total depth of 3,034 feet and the hole filled up 2,000 feet with oil and it has the appearance of a 25-bbl. well.

In Springhill Township, Greene County, the Northeastern Gas Co. deepened their test on the F. Burley and T. B. Ward lease after the gas had been exhausted to 3,350 feet. The Gordon sand was topped at 3,273 feet with oil estimated at 4 bbls. a day at 3,279-3,307 feet. There was about 148,000 feet of gas a day in the Gordon Stray.

In Springhill Township, Greene County, James H. Null, Agent completed a test on the John Sellers farm at a depth of 1,393 feet, the Big Dunkard sand, as a gas well gauging 2,537,000 feet a day. The Pittsburgh Coal was at 789-97 feet. In this township, the test of Null and Moorhead on the Hixenbaugh heirs farm was drilled to 1,960 feet through the Second Salt sand and it was dry.

In Cumberland Township, Greene County, the Equitable Gas Co. completed deepening No. 1 on the Rumble farm at 2,953 feet. The Bayard Stray sand was at 2,950 feet with a gas volume of 2,195,000 feet a day.

In Peters Township, Washington County, the Carnegie Natural Gas Co. completed the test on the George Douglass farm at 2,441 feet. The Gordon sand was at 2,406 feet with gas at 2,433 feet and 2,436-39 feet. The volume is 240,000 feet a day.

In Robinson Township, Washington County, McCandless and Shaffer drilled a dry hole on the Matthew Bigger farm. It penetrated the Fourth sand to a depth of 2,200 feet.

Springhill Township, Greene County,, is becoming more active with the results of the recent completions. On Knob Run, the Northeastern Gas Co. has a rig standing on the J. W. McNichols farm. In Richhill Township, Smith B. McCracken has started drilling on the Willis A. Campbell farm on Big Wheeling Creek.

In Center Township, Greene County, the Penn Ohio Oil & Gas Co. has reached 1,890 feet on the W. L. Funk farm with bad red rock caves at 1,140-65 feet and again at 1,290 and 1,530 feet. The Carnegie Natural Gas Co. has spudded in No. 2 on the J. W. Milliken farm. In Dunkard Township, this company is drilling at 405 feet on the Brand farm and rigging up on the Parker test.

In Amwell Township, Washington County, the Union Gasoline & Oil Corp. is down 2,140 feet and 1,200 feet on the A. O. Vankirk farm. The Carnegie Natural Gas Co. made a location for No. 3 N. B. Redd and a location for No. 2 Menzer which will be drilled down to the Fifth sand for oil. The Manufacturers Light & Heat Co. has reached 2,415 feet on the Rankin farm and 1,050 feet on the Weaver farm. William Bungard and others reached 405 feet on the J. M. Hanna farm, and is underreaming at 1,787 feet on the Clyde Hinerman farm. A. V. Lewis and others are pulling casing to underream on the Mankey farm at 1,750 feet. J. Perrin and others have started drilling their test on the B. A. Bonham farm.

The deep test of Norwood Johnston and others on the James McBurney farm in Mount Pleasant Township, Washington County, is making progress. The whipstock was drilled by and then a star bit lost which can be recovered.

The deep test of Laughner-Wittmer on the William Wilsman farm in Independence Township, Beaver County, made progress by the tools cemented in the hole and then shut down to cement below the tools. The deep test of Phillips-Wittmer 1 mile south of Prospect in Franklin Township, Butler County, on the Perry S. Davis farm, is making fair progress.

SOUTHEAST OHIO

In Medina County, G. C. Lacknett completed No. 2 Allis, Lot 5, Harrisville Township, in the Berea grit at 361 feet. It produced 5 bbls. the first day after shot.

In Morgan County, Barnesville Development Co. drilled No. 3 James Danford, section 12, Center Township, to 1,646 feet. Berea grit yielded only water and the well is a failure.

In Muskingum County, the Atha Drilling Co. on the Mattie Christman farm, section 18, Springfield Township, drilled through the Clinton sand to 3,610 feet and was dry.

In Washington County, the Hune Brothers and others completed a test on the M. G. Eddy farm in section 34, Independence Township, in the Salt sand at 960 feet. It is good for 2 bbls. a day before shot. In the village of Newport, section 27, Newport Township, Vinton Dinsmoor and others drilled a test on the J. M. Cook heirs lease through the Injun sand to 1,310 feet. It was dry.

WEST VIRGINIA

One deep test was completed during the week. In Poca district, Kanawha County, the United Carbon Co. completed No. 1 on the W. P. Moss farm in the Oriskany sand at a total depth of 4,997 feet. The Oriskany sand was topped at 4,987 feet and it has a gas volume of 9,000,000 feet a day.

Two additional locations were made in this field. In Poca district, E. G. Summers has a location for a test on the Laura M. Flowers farm with the ground elevation at 938 feet. The United Fuel Gas Co. has a rig up for No. 4,706 on the C. B. Graham 578-acre farm.

In Malden district, Kanawha County, Godfrey L. Cabot, Inc. reached the top of the Corniferous lime at 5,012 feet in the William Tompkins heirs No. 9. The United Fuel Gas Co. has reached 2,700 feet and 1,150 feet in the Nos. 4,658 and 4,679 on the Georges Creek Land & Mining Co. lease.

In Elk district, Starcher and others reached the top of the Oriskany at 4,982 feet on the G. W. Wolfe farm but had not reached the gas. Benedum-Trees are drilling at 1,300 feet on the Mary J. Slack farm south of the Wingfield farm. The United Fuel Gas Co., shut down at 4,969 feet, is cementing casing on the Orth and Walker lease. Same company's No. 4,667 is drilling by the tools at 4,710 feet on the A. J. Bruen and others lease. No. 4,687 is drilling at 4,644 feet on the Henry A. Walker farm. The Columbian Carbon Co. is down 4,975 feet on the Jeff Medley farm, 4,874 feet on the C. W. Vickers farm, 3,010 feet on the Ida Hughart farm, 1,550 feet on the Susan I. Givens farm.

Other Completions

Four producers were completed in West Virginia during the week. In Clay County, Henry district, the Virginian Gasoline & Oil Corp. completed No. 37 Brown, Swan, Goshorn & Geary in the Injun sand at 1,901 feet. It is good for 20 bbls. a day.

In Kanawha County, the Pure Oil Co. completed No. 267 Williams Coal Co. lease in Cabin Creek district as a 5-bbl. producer from the Berea sand at 3,260-3,304 feet.

In Ritchie County, Floyd Marple and others completed a test on the Abel White farm in Grant district at a depth of 1,940 feet. It was filled back to 1,830 feet to produce 3 bbls. a day from the Keener sand which has also 29,112 feet of gas.

In Roane County, the South Penn Oil Co. completed No. 111 on the O. D. Stockley farm in Geary district in the Injun sand at a depth of 1,820 feet. It is good for 5 bbls. a day.

Gas Wells

In Boone County, the Owens-Illinois Glass Co. completed two gas wells and one dry hole, which is more interesting. Its No. 7 on the Broun and Cochran lease was drilled through the Oriskany sand at 4,654-68 feet and is a failure.

In Lincoln district, Wayne County, the Owens-Illinois Glass Co. completed the test on the Sarilda Judd farm as a gas well gauging 149,000 feet a day from the Brown shale at 2,186-2,665 feet with gas at 2,189-2,490 feet. Their test on the A. J. Ballard farm in Washington district, Boone County, is a gas well in the Berea sand at 1,714-44 feet with gas at 1,716-30 feet. It gauged 105,000 feet per day.

In Braxton County, Kenney M. Hunt and others completed a test on the Claude Newell farm in Otter district at a depth of 1,890 feet, in the slate. It is a gas well gauging 300,000 feet a day.

In Cabell County, the United Fuel Gas Co. completed No. 4,695 R. L. Harris in Barboursville district at 2,964 feet as a gas well in Brown shale at 2,615-2,964 feet with 368,000 feet of gas at 2,640-2,905 feet. In McComas district, the Kentucky-West Virginia Gas Co. drilled a test on the R. L. McCallister farm through the Brown shale to 3,543 feet and abandoned it as dry.

In Calhoun County, Godfrey L. Cabot, Inc. completed a test on the Sarah J. Ferrell farm in Sheridan district in the Injun sand at a depth of 1,712 feet. It is a small gas well.

In Lincoln County, the Owens-Illinois Glass Co. drilled a test on the Gordon Adkins and others lease in Jefferson district to a depth of 2,487 feet and plugged it.

In Marshall County, F. J. Watson completed No. 3 on the Loudenslager heirs farm in Cameron district in the Gordon Stray sand at a depth of 2,690 feet. It is a gas well good for 300,000 feet a day.

In Pleasants County, Clifford Love and others drilled a test on the John Delong farm in Grant district to a depth of 1,923 feet. There was no sand at all and it was abandoned.

In Ritchie County, two tests were dry. Sherman Ridgeway and others drilled a test on the Paul Riggs farm in Clay district through the Maxon sand to 1,740 feet and it was dry and abandoned. In Grant district, the Hope Natural Gas Co. drilled No. 6,128 on the A. R. Bradley farm deeper to 1,720 feet and it was dry.

In Roane County, L. L. Reed and others completed No. 2 on the A. J. Hinzman farm in Harper district in the Salt sand at a depth of 1,450 feet. It is a gas well gauging 3,000,000 feet a day. It is 400 feet north of the No. 1 and additional drill-

(Continued on Page 315)

Southwest Texas District

POOL IN LIVE OAK COUNTY; EXTENSIONS AND NEW PAYS

By
GEORGE WEBER

HOUSTON, Tex., Dec. 28.—Despite the general holiday lapse of drilling operations in Southwest Texas during the past week, a number of discoveries were made which showed important production potentialities in that area. In addition to sand extensions and prospects of new sand production in the Saxet, Bentonville, Hoffman and Plymouth fields, a new field was opened by the completion of a Live Oak County wildcat, and a Nueces County wildcat test is showing indications of adding still another field to that county. Volume of completions dropped during the week. Announcement was also made of considerable future drilling to be done, and several areas are to be drilled in important tests shortly. The second deep test in the Edwards Plateau area to the north was apparently failing to show for any production, detracting somewhat from the interest in that area, which has been excited by recent wildcats.

The new oil producing area in Live Oak County, located on the edge of the old Oakville gas field, was opened during the week by the completion of the Ohio Fuel Supply Co. No. 1 Rosebrock. The test, which over two weeks ago showed 106 feet of pipe line oil in 14 minutes at 2,797-2,807 feet and later blew out and ran wild, was completed for an initial production of about 2 bbls. per hour through a three-eighths inch choke and 7,000,000 feet of gas. The sand is correlated as the Pettus, and the test is bottomed at 2,808 feet.

Operators who completed the discovery well are planning to move the rig 600 feet to the south on the Reagan tract and drill a second test shortly.

Deep Pay in Bentonville

An important new deep sand in the Bentonville field was cored during the week by the LaJita Corp. in the No. 2 Bowers test in section 14. The test, located in the northern part of the field, tested the sand at 5,653-58 feet and recovered 18 feet of oil in four minutes. Another test was made after carrying the test to 5,685 feet and 14 stands of oil were recovered in four minutes, at a working pressure of 100 pounds and with one-quarter and three-eighths inch top and bottom chokes. The crude is reported to be light yellow in color with a gravity of 50 degrees. The sand which is reported to be in the Vicksburg is the deepest yet opened in the field on the upthrow side of the faulted area.

Clara Driscoll Field

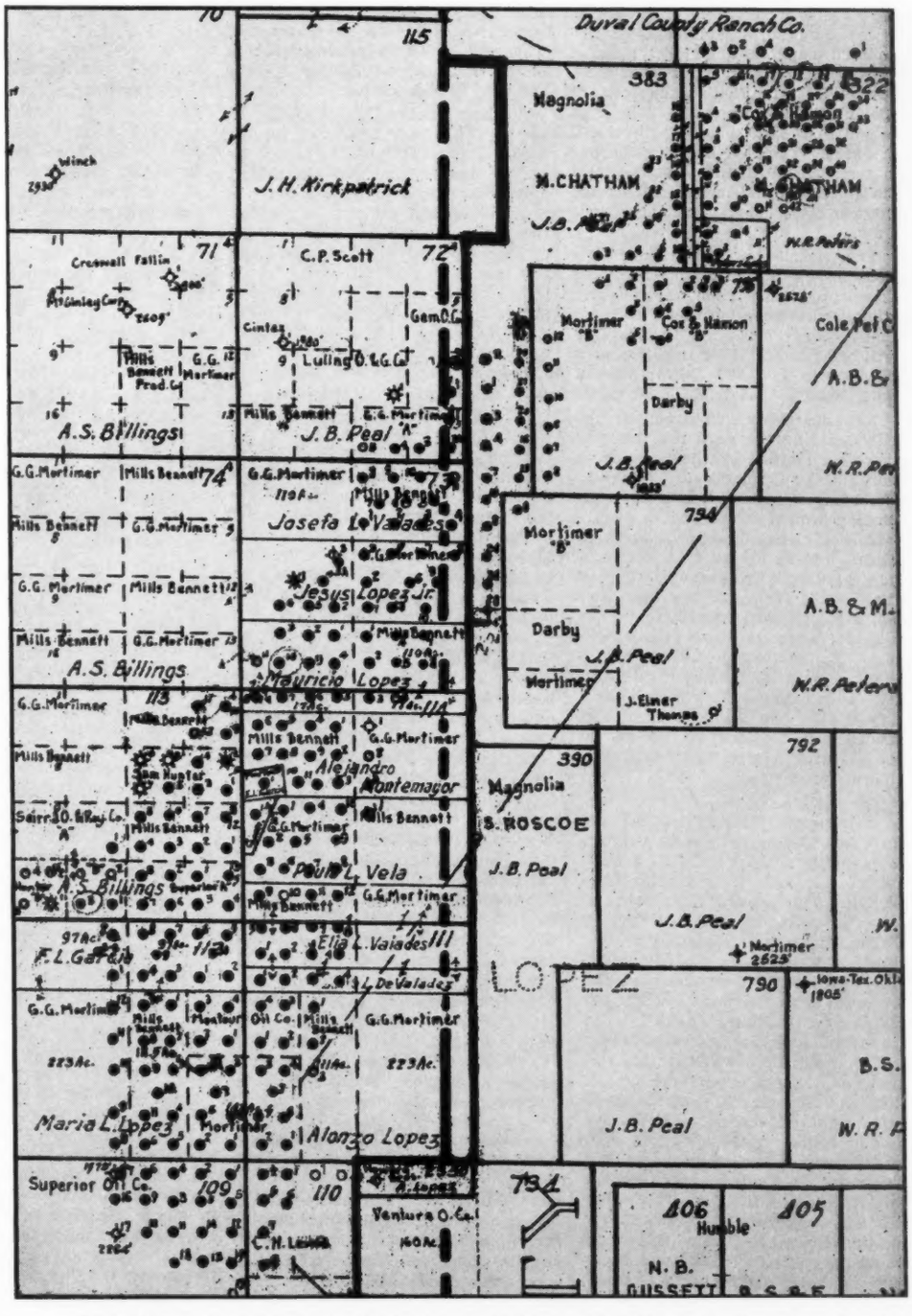
In the vicinity of the townsite of Driscoll, the Clara Driscoll field of Nueces County is seeing constantly increased activity. Several wells are drilling, one test is reported to be producing gas and distillate from a new deep sand, and another test was spudded in during the week. The Mid-Continent Petroleum Corp. made its initial entry into the field with No. 1 Driscoll Sevier this week, located in the north offset position to the first Magnolia producer in the field, recently completed. In addition, Buchanan and Blanco Oil Co., W. D. Hines, H. M. Reed, and Wellington Oil Co. are drilling in the field, and the Conroe Drilling Co. and H. M. Reed No. 1 Meyer, in the Driscoll townsite, was abandoned at 4,505 feet having failed to find production. The W. D. Hines No. 1-A Sevier, on which information is being withheld, is reported to be making gas and 2 bbls. of distillate per hour at 5,850 feet. That test is located in a northwest outpost position with reference to the field.

Saxet Field

The Saxet field, most active in the Lower Gulf Coast and Southwest Texas areas, received important developments during the week. A slight northeastward extension to the production in the 4,800-foot horizon was indicated in the drill stem test made on Pan American Production Co. No. 1 Solar Sevier. The test, located in the G.S.&S.F. Survey recovered 600 feet of oil in five minutes at 4,835-42 feet and casing is being set.

Deep sands in the field continues to attract considerable interest. A new and deeper sand which had shown for gas production in a test

(Continued on Page 315)



Rapid drilling of several operators in the Lopez field, Duval and Webb counties, has extended the field consistently to the northeast. Activity has reached Survey 901 where the Humble Oil & Refining Co. has begun initial operation in the field.—(Porter Regenold, Maps, Corpus Christi)

Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, Dec. 26.—Actual sales of naphtha and crude from the Turner Valley field to the Imperial, Bell and British-American refineries will considerably exceed 1,000,000 bbls. for the current year. Deliveries to the Imperial refinery in November comprised 5,163 bbls. of clear naphtha, 55,497 bbls. of discolored naphtha and 1,992 bbls. of light crude, a total of 62,652 bbls. Deliveries to the British-American Oil Co. in Calgary were 25,327 bbls. of crude and 4,229 bbls. of discolored naphtha. The Bell Refining Co. has not reported deliveries, but the total deliveries for the month will exceed 100,000 bbls., being the highest since July.

For December a production of 110,000 bbls. is estimated, this including some production from the recently completed Foundation Royalties No. 1 and Sterling-Pacific No. 3 wells. This will bring the total for the 12 months of 1936 to 1,054,334 bbls. compared with 966,528 bbls. in 1935.

Naphtha production gradually declined during the year, but this was more than offset by the bringing in last June of Turner Valley Royalties No. 1 crude producer which has been making around 25,000 bbls. a month.

There is considerable variation in quality of the crudes from different new producers on the west side of the field. Turner Valley Royalties No. 1 grades 46.6 commanding $1.73 a barrel under the new price schedules. Foundation Royalties No. 1 has increased its grading to 52 gravity, commanding $1.93 a barrel. Sterling Pacific No. 3 grades 44.7. The tendency is for the gravity to increase after a well has been some time in production.

The new schedule of prices will tend to widen the market for the increased Turner Valley output which is generally anticipated with a number of west side tests nearing completion. The present assumption is that successful completion of Turner Valley Royalties, Foundation and Sterling Pacific wells proves a crude reservoir on the west flank of the structure of undeterminate width but definitely extending some 2½ miles north and south; and that other wells now drilling will tap this reservoir and likely extend the proven field still farther. The marketing of so large a production would involve new problems for the operators even after allowing for the complete displacement of Montana crude, which cannot be effected at once owing to existing commitments by the major refining companies. The production would have to be handled entirely by tankcars, for the time being at least, as construction of pipe lines to deliver crude to Vancouver on the west and Regina on the east would involve enormous investments which might not be justified by the refinery capacity in these places.

Turner Valley Completions

On the west side of South Turner Valley, Foundation Royalties No. 1, LSD 5, section 21-18-2w5, is preparing to run 2½-inch tubing to conserve gas and increase production. The well has been producing about 580 bbls. a day of 52-degree crude through 13-inch casing.

Sterling Pacific No. 3, LSD 13, section 33-18-2w5, bottoming in the Madison lime at 6,238 feet, has installed control head and run tubing, and is making a definite production test. No official estimate of production has been given out but unofficial estimates placed it between 500 and 600 bbls. a day of 44.7 A.P.I. crude before tubing. In the southwest corner of the same section, Sterling-Pacific No. 4, LSD 4, a quarter mile north of Turner Valley Royalties No. 1, is below 5,487 feet and expected to get the lime around 6,400 feet.

In section 28-18-2w5, B. & B. Co. No. 1, LSD 12, is in the top of the Dalhousie sands below 5,885 feet and expected to get the Madison lime around 6,235 feet. Open hole is being carried from the water shut-off at 500 feet clear to the lime with 11½-inch bit, and 6-inch casing will be landed on the lime. Casing is now being hauled. This is the first time open hole has been drilled practically the entire distance in a Turner Valley well.

West Turner Petroleums No. 1 has been spotted in section 31-18-2w5, a quarter mile west of Sterling Pacific No. 4.

In section 20-18-2w5, Monarch Royalties No. 1, LSD 9, west and north of Foundation No. 1 producer, is moving in equipment. It is expected to spud this month. Hilary Head and C. E. Snyder have the drilling contract. McDougall-Segur Exploration Co. is forming a subsidiary company to drill a test in LSD 1, same section, offsetting Foundation No. 1 producer to the southwest.

Farther south, in section 17-18-2w5, Prairie Royalties No. 1, LSD 16, is digging cellar. Firestone Petroleums No. 1, LSD 13, section 16-18-2w5, has cellar dug and is moving equipment. William Ferris will have charge of both these tests.

High River Operations

In the High River area east of Turner Valley, Arca Development Corp. No. 1, NW section 24-18-1w5, is below 8,608 feet with no change in formation. The objective is the Madison limestone which was originally expected around 7,500 feet but has not yet been reached. The well, backed jointly by Imperial Oil, Ltd., Canadian Western Natural Gas, Light, Heat & Power Co. and Calgary and Edmonton Corp., is the deepest in the British Empire and is testing the theory that the main crude oil reservoir from which the Turner Valley naphtha and light crude are derived lies to the east of that field. Drilling will be continued to 9,000 feet if necessary.

On the Aldersyde structure, Ranchmen's Gas & Oil Co. No. 1, LSD 16, section 13-20-29w4, is below 7,032 feet.

New Valley Test

On the New Valley structure, northwest of Turner Valley, McLeod Oil Co. No. 1, LSD 4, section 6-21-2w5, is at 6,971 feet and swabbing to lower the oil which is standing between 700 and 1,000 feet in the hole. Attempts to cement casing have been unsuccessful owing to the oil. The crude comes from the cardium sandstone 200 feet or more from the bottom of the hole and potential production is estimated from 25 to 30 bbls. a day.

Border Fields

On the Del Bonita structure south of Lethbridge, Sunshine Oils No. 1, LSD 10, section 19-1-21w4, encountered a heavy gas flow in the Ellis formation at 5,097 feet. It set liner at 5,157 feet and changed to cable tools to complete the hole. It got the Madison lime a little below 5,172 feet with a strong gas flow and oil showings in the bailer, the showings increasing as it was deepened in the lime. Production is being tested.

On the South Twin River structure, Del Bonita Associated Oils No. 3, LSD 9, section 10-2-20w4, has resumed from 3,510 feet after a temporatory shut down due to bad weather. It is expected to get the Madison lime around 3,900 feet with potential production at the Ellis-Madison contact.

West of proven production in the Red Coulee field, west of Coutts, Midway Oil Co. has been spotted in LSD 11, section 4-1-17w4.

W. C. Fisher of Calgary, president of Model Oils, Ltd., and Leo Sweeney, manager of the Maple Leaf refinery at Coutts, have filed on approximately 4,000 acres on the Alberta end of the Sweetgrass arch, immediately north of the international boundary. The same interests hold 6,000 acres adjacent on the Montana side. Arrangements are being made to drill No. 1 well on the Montana acreage about a mile south of the boundary.

Gold in Tar Sands

It is reported at Edmonton that analysis of samples of the bituminous sands of northern Alberta in connection with prospective separating and refining operations near McMurray indicated a gold content of 70 cents per ton. The International Bitumen Co. which has a small refining plant north of McMurray is planning to install equipment to recover the gold.

Drilling in Ontario

In Kent County, F. W. Burchell and associates No. 2, SE quarter Lot 12, Concession 14, Raleigh Township, finished at 1,560 feet with 37,000 feet of gas a day. It was shot with 100 pounds of dynamite and later given a second shot of 300 pounds, but failed to increase the flow very much.

In the Eden field, Elgin County, McKechnie Syndicate No. 1, W half Lot 24, Concession 8, Bayham Township, finished in the Clinton sand below 1,300 feet with a flow of 250,000 feet a day.

California Fields

(Continued from Page 292)

the Ten Section field unless something of importance is picked up in the immediate future. Chanslor Canfield Midway Oil Co. has abandoned well No. 7 in the Coffee Canyon section of the Round Mountain field as a duster at 1,753 feet. Top of the Vedder was logged at 1,157 feet and top of the Walker at 1,241 feet.

Inglewood

In the Inglewood field of Los Angeles Basin, Standard Oil Co. successfully completed No. 81 Los Angeles Investment flowing 1,107 bbls. of 24.1 gravity oil and 277 bbls. of water per day. This new well, bottomed at 3,550 feet, was finished with a 6⅝-inch liner carrying perforations at 2,724-3,417 feet and 3,470-3,549 feet and cemented through perforations at 3,467 feet. In the Dominguez field of Los Angeles Basin Shell Oil Co. has completed No. 86 Reyes in the First Callender zone flowing 268 bbls. of 32.3 gravity oil per day from 4,699 feet after the hole had been plugged back from 4,850 feet. The water shutoff was effected by a string of 8⅝-inch landed and cemented at 4,565 feet and the well finished with a 6⅝-inch liner including 133 feet of perforated. The company believing that production can be increased by artificial stimulation is rigging up a compressor. Union Oil Co.'s deep test, No. 50 Callender, bottomed at 8,447 feet failed to get an effective water shutoff on the 8⅝-inch landed at 6,860 feet on the first try and the string was recemented. Union is starting three new wells in the Dominguez field and Shell is making preparations to spud in two additional wells on the Reyes lease. In the Richfield district, Union Oil Co. has completed No. 38 Chapman and this new well was brought in pumping 149 bbls. of 23.6 gravity oil per day from 3,546 feet. The company's deep test in this field, No. 29 Chapman, has reached a depth of 8,610 feet but is being held up with mechanical trouble resulting from a twistoff which left 3,300 feet of drill pipe in the hole.

In the Huntington Beach field of Los Angeles Basin the Texas Co. has recompleted No. 4 Brown after redrilling and deepening the hole from 3,250 feet to 4,027 feet and the well was returned to production pumping 405 bbls. of 24.6 gravity oil per day. The Huntington Beach field is experiencing a revival of drilling after a dormant period of several years and operators have succeeded in completing a number of new wells that have shown favorable production and recompleting others after clean out or deepening jobs. The Redondo section of the Torrance field on the other hand is registering a consistent decline but may show a little gain due to activity stimulated by completion of Dearborn Oil Co. No. 1 Flint. This additional work should be rather limited in extent however. The Black Gold Corp. successfully completed its No. 2 Redondo in the Torrance field a few days ago and this new well was brought in pumping 61 bbls. of 14.9 gravity oil per day from 3,690 feet after the hole had been finished with a 4¾-inch liner carrying 389 feet of perforated.

Central West

Operations in Central Ohio, Kentucky, Illinois, Indiana

By GEORGE A. WHITNEY

FINDLAY, Ohio, Dec. 28.—Although geologic and seismic reconnaissance in the central coal basin area of Illinois, has subsided a great deal, major companies are still securing large blocks of acreage in that section and preparations are being made to start drilling operations within the next few months.

The actual conclusions the major companies have drawn from their extensive exploration of this area are still being withheld, as well as information concerning their holdings and drilling programs, but the belief that desirable acreage is very scarce in the basin area at the present time, seems to be proven by the fact that some of the major companies are extending their explorations into Indiana in search of possible oil production acreage.

A few of the large companies have staked locations and stared drilling operations in the Illinois Basin but the majority of them will not start actual work until early spring. The Pure Oil Co.'s deep test on the George Bradley farm, in section 26-1n-7e, Bedford Township, Wayne County, about 3 miles east and south of Cisne, is reported to be drilling below 2,800 feet and is scheduled to go to a depth of between 6,000 feet and 7,000 feet, unless oil should be found above that level. The Pure Oil Co. has leased up practically all the acreage in that area and there is very little interest held by any other company.

The second deep test being drilled by the Pure Oil Co. on the Gene Weiler farm, in section 33-3n-8e, Clay City Township, Clay County, is drilling below 1,600 feet and the majority of the nearby acreage is held also by the Pure Oil Co.

The Pure Oil Co. has also staked two new locations for deep tests to be started in the near future. One of these is to be drilled in Jasper County and the other in Richland County, but the exact locations have been withheld to date. Both are scheduled for the St. Peter sand, which, it is believed, will be found at about 7,000 feet.

Test in Boyd County

A rig has been placed on location about 2 miles south and west of Greenville, in Boyd County, and is located between two gas fields which are about 6 miles apart, but no wells have ever been drilled between these fields. The operators drilling this test do not expect to find oil in the shallow sands, which are producing in this area, but they do expect to find oil at about 2,000 feet, which would be below the Mississippi lime in that section.

It is also reported that a deep test is to be drilled in the middle of the old Sandoval field, which has been producing oil for the past 30 years, from a depth of about 1,530 feet. This new test is scheduled to go to a depth of between 6,000 feet and 7,000 feet.

Recent Acreage Plays

The Nollem Oil Co. has purchased a block of oil and gas leases containing approximately 20,000 acres, which is located principally in Shiloh Township, 2s and 2e, Jefferson County. A test is to be started in this block within the next two months and there is a possibility of finding oil in this area at about 1,300 feet. If that depth should prove dry, however, the well will be drilled to a depth of around 6,000 feet or 7,000 feet, unless oil or gas in paying quantities is found above that depth.

Another large block of acreage has been purchased by one of the major companies in the northern part of Jefferson County, Rome Township, 1s and 2e, near Dix, Ill., and a deep test will be started in this block within 60 days. Royalties in this area are already selling from $15.00 to $40.00 per acre for a one-half interest of the farmers' royalty.

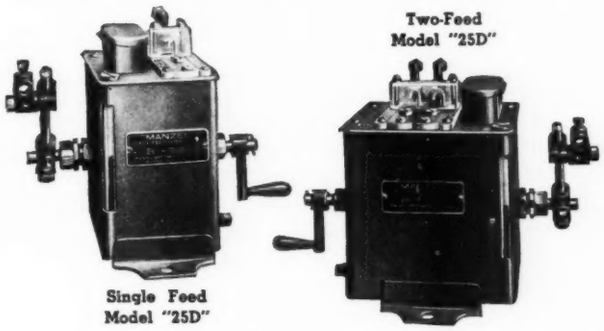
The Texas Co. has purchased a large block of acreage about 6 miles southeast of Mount Vernon, in Dodds Township 3s and 3e, and it is reported that this company will start drilling operations in the spring.

The Ohio Oil Co. has also purchased a large block adjoining the Texas block, due east of Mount Vernon, but there is no information as to when the Ohio Oil Co. will start activity.

CENTRAL OHIO FIELD

Activity in the Central Ohio field

"MANZEL"
Force Feed Lubricators



Two-Feed Model "25D"

Single Feed Model "25D"

For Most Efficient and Economical Lubrication of Cylinders and Bearings

The "Manzel" Model "25" Lubricator will handle any grade of oil and will deliver it to the cylinder or bearing, regardless of pressure or temperature, in exact proportion to the speed of the engine, or other equipment, on which installed.

Will feed plenty of oil for the heaviest duty engine or pump, yet may be regulated to supply fractional parts of a drop when used on compressors requiring very little lubrication.

Built to withstand hard usage, and to pump against high pressure. Has a wide range of adjustment and extra large reservoir capacity.

PUMPING UNITS REMOVABLE WITHOUT STOPPING LUBRICATOR—All working parts completely enclosed in reservoir, yet any unit may be removed in two to three minutes time without stopping lubricator or interfering with other units.

FEED ALWAYS IN SIGHT—A large, clear-vision, heavy glass sight feed shows at all times exactly how much oil is being supplied. Not simply an indicator to show lubricator is working, but actually shows the number of drops being delivered to each point.

ACCURATE FEED REGULATION—Each feed independently adjustable and may be regulated to supply from a fractional part of a drop to a maximum of 13 drops with every plunger stroke.

Made with 1 to 30 feeds, rotary or ratchet drive

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336-338 Babcock Street Buffalo, N. Y., U. S. A.

Also manufacturers of the MANZEL chemical feeder for injecting treating compounds into oil lines.

BIGGER PROFITS from PRODUCTION

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Many producers who investigated JENSEN Units as a matter of routine are now enthusiastic boosters.

You can't afford to take it for granted that there is anything "just as good." Eighteen years of experience are built into JENSEN Pumping Equipment.

So—start the New Year by seeing the JENSEN dealer in your territory, or write us at Coffeyville.

JENSEN BROTHERS MANUFACTURING COMPANY

Coffeyville, Kansas, U.S.A.

continues to increase and 14 new locations were staked out during the past seven days. Two oil producers were completed in Perry County this past week, one made 50 bbls. and the other produced 47 bbls. Preston Oil Co. No. 142, on the Sunday Creek Coal Co. property, in section 36, Coal Township, was completed in the Clinton sand at 3,643-70 feet, and made 50 bbls. of oil and gauged 215,000 feet of gas after a shot of 90 quarts. In section 25, same township, Kachelmacher Estate No. 16, Hemlock Coal Co. was completed below the Clinton sand at 3,554-93 feet and made 45 bbls. after being shot with 110 quarts. In section 28, Hopewell Township, Wehrle Brothers No. 1 J. M. Alberts, is fishing for tools at 1,500 feet. In section 31, Ohio Fuel Gas Co. made a location on the Dora Lonas farm, and in the same section Hopewell Gas & Fuel Co. is building a rig on the L. & F. Dower property. In section 2, Monroe Township, Wehrle Brothers No. 5 Worley Deaver, was drilled through the Berea sand at 1,032-53 feet with a small show of oil and gas. After being shot with 30 quarts it is making 20,000 feet of gas and bails 4 bbls. of oil a day. In section 31, same township, Preston Oil Co. is rigging up on the W. T. Marshall & Co. property. In section 18, Clayton Township, Mid East Gas Co. is building a rig on the E. E. Williams & Co. location.

In Vinton County, section 1, Brown Township, I. C. Robinson No. 1 B.&O. Southwestern R.R. Co. property, was drilled through the Clinton sand at 3,458-88 feet, Gray slate at 3,488-96 feet, Medina Red at 3,496-3,520 feet and Gray slate at 3,520-41 feet without a show of oil or gas and was abandoned.

In Tuscarawas County, section 21, Clay Township, George Jewell No. 1 Frank Kinsey, made 45,000 feet of gas in the Berea sand, but was plugged when the volume blew down to 13,000 feet. In section 14, Perry Township, Frye & McCracken No. 3, on their own property, was drilled 2 feet into the top Berea at 1,280 feet and made 12,000 feet of gas.

In Morgan County, section 20, York Township, Hopewell Gas & Fuel Co. No. 4 Elizabeth Floyd, was completed below the Clinton sand at 4,151-88 feet and gauged 780,000 feet of gas naturally. In section 12, Center Township, Barnesville Developing Co. No. 1 J. Danford, was drilled to 1,542 feet and bailed 5 gallons of oil with 700 feet of water in the hole 15 hours after shot. In Lot 2, Marion Township, Ohio Fuel Gas Co. No. 1 George Hill, was drilled through the Injun sand at 1,181-93 feet and was abandoned when the hole filled with water.

In Holmes County, section 17, Washington Township, Ohio Fuel Gas Co. completed a commercial gas well on the George Young farm, in the Clinton sand at 2,748-58 feet. The same company has staked two new locations in this county, one on the George Ley farm in section 3, Ripley Township, and the other on the Eli Yutzy farm in section 26, Paint Township.

William Dempsey has staked a new location on the N. Miller property in section 10, Avon Township, Lorain County. In Lot 62, Columbia Township, Snyder & Wiles are spudding on the Mary Walker farm. In Lot 82, Grafton Township, Wittmer Oil & Gas Co. No. 1 H. W. Ingersoll was completed in the Clinton sand at 2,627-32 feet and made 880,000 feet of gas naturally. In Lot 99, Eaton Township, Ohio Fuel Gas Co. No. 1 J. Stanislawski, made a small volume of gas and has been plugged.

East Ohio Gas Co. No. 1 E. & E. Richard, in section 15, Plain Township, Stark County, was completed below the Clinton sand at 4,571-99 feet and gauged 840,000 feet of gas after a shot. In section 16, same township, Pfieffer & Co. are rigging up for No. 2 on the A. V. Pontius farm.

In Wayne County, section 7, Canaan Township, Harley Brothers are rigged up on the Charles Yocum property.

In Ashland County, section 28, Ruggles Township, Kline Co. is spudding on the Charles Crittenden property. In section 28, Mohican Township, Faulkner & Phelps No. 2 Martin Humm is also spudding. In section 10, Lake Township, Stewart & Co. are spudding in No. 2 on the Eliza Charst farm. Ohio Fuel Gas Co. has staked a new location on the Ralph Fishpaw farm in section 16, Orange Township.

KENTUCKY FIELDS

Five completions were reported in the Kentucky fields. In Ohio County, in the Dundee pool, Petroleum Exploration Co. No. 14 R. & H. Graham, made 40 bbls. the first 24 hours after a shot. In the same pool, Henry Scholl No. 3 Alex Whitehouse, had an initial production of 30 bbls. after a shot. McGowen & Co. No. 1 V. R. Ferguson was a duster. In the same pool, James & Ford No. 3 Mary Hardin, was also a duster. In the Deanfield pool, same county, Kentucky Natural Gas Co. No. 25 Mamie Rodgers & Co., had an initial production of 30 bbls. after a shot.

INDIANA FIELDS

Three dry holes and three oil producers, with a total new production of 35 bbls., were completed in the Indiana fields. In Vigo County, section 32, Prairie Creek Township, Ohio Oil Co. No. 3 Mabel Prevo, had an initial production of 15 bbls. after a shot. In the same section, Siosi Oil Corp. No. 7 F. I. Williams, made 25 bbls. the first 24 hours after a shot.

In Spencer County, section 14, Huff Township, J. S. Albertson No. 8 Arthur Ray, was drilled to a total depth of 731 feet and produced 4 bbls. after a shot. In section 28, Luce Township, P. M. McMahan & Co. are drilling No. 1 John Stevenson. In Grass Township, section 13, Hollingsworth Gas & Oil Corp. is drilling No. 1 Patrick Axton. In section 12 Ed Lorch No. 8, on his own property, is down 375 feet.

In Perry County, section 27, Clark Township, Gardner Oil Co. No. 2 Mrs. M. Flamion, was a duster. In section 30 Dice & Zoercher No. 13 Alvin Franchville is down 250 feet. In section 18, Oil Township, Charles Wyman No. 1 Ida Risler was drilled to a total depth of 270 feet and was abandoned as a dry hole. Louis Stamp No. 1 J. & E. Boerste, in section 21, Troy Township, was also a dry hole at a depth of 715 feet. Charles Dice No. 4 Charles Krutz, in section 26, Anderson Township, is drilling below 600 feet.

"MANZEL"
Chemical Feeders

Model "CH-61"
Ratchet Drive

with 3-Gallon
Reservoir and Sight Feed

For Injecting Treating Compounds into Crude Oil Lines

The "Manzel" Series "60" Chemical Feeder feeds the chemical into the oil line in exact proportion to the amount of oil pumped.

Entire driving mechanism enclosed and operates in bath of oil at all times.

Pumping unit, the only part that comes in contact with the chemical, is arranged on outside of feeder where it is readily accessible.

PISTON VALVE ACTION—Fitted with Manzel patented piston valve, the most satisfactory valve for handling treating chemical. Only one valve used for both suction and discharge. Valve may be taken out for cleaning without disconnecting feed line.

ACCURATE REGULATION—Feed may be adjusted to supply from a fractional part of a drop per stroke up to any amount desired.

CHEMICAL RESERVOIR—Feeders are furnished with or without three-gallon chemical container. Container has large hinged cover for quick filling, stainless steel gauge (graduated in quarts) and an extra large strainer which does not interfere with filling.

SIGHT FEED—Any "Manzel" Feeder can be supplied with sight feed to show the exact amount of chemical being pumped.

Made with ratchet, rotary or direct lever drive.
For flowing wells can be supplied complete with Electric Motor, or Rotary Gas Motor, Drive

Write for Bulletin 60-A

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336-338 Babcock Street Buffalo, N. Y., U. S. A.

GULF COAST WATER SHIPMENTS, SEPTEMBER, 1936—(BARRELS)

Company and terminal—	Crude		Refined		Total
	Coastwise	Export	Coastwise	Export	
Atlantic Pipe Line Co.:					
Atreco	1,398,396.68		6,371.90		1,404,768.58
Texas City	194,400.62		4,258.11	2,200.18	200,858.91
Harbor Island	627,325.51	26,295.08			653,620.59
Coastal Refineries, Inc.:					
Port Isabel			161,891.00		161,891.00
Eastern States Pet. Corp.:					
Houston			433,600.51		433,600.51
Gulf Oil Corp.:					
Port Arthur	449,646.14		2,635,454.75	86,969.25	3,172,070.14
Humble Oil & Ref. Co.:					
Baytown	308,513.06	255,352.83	3,125,952.89	811,475.21	4,501,293.99
Harbor Island	2,164,267.36				2,164,267.36
Texas City	581,716.34				581,716.34
Ingleside	30,008.66				30,008.66
Magnolia Pet. Co.:*					
Beaumont	806,484.35		2,301,517.52		3,108,001.87
Pure Oil Co.:					
Smiths Bluff	374,133.00		799,943.00		1,174,076.00
Shell Pet. Corp.:					
Houston	330,133.00	183,489.00	1,610,296.00	333,626.00	2,457,544.00
Norco			265,655.00	62,374.00	328,029.00
Standard Oil (La.):					
Baton Rouge	234,083.52	36,670.23	1,632,957.10	494,599.98	2,398,310.83
Texas Co.:					
Port Arthur	1,499,580.00	679,111.00	2,528,301.00	686,332.00	5,393,324.00
Miscellaneous	3,870,918.00	511,270.00	1,454,264.49	543,465.00	6,379,917.49
Total	12,869,606.24	1,692,188.14	16,960,463.27	3,021,041.62	34,543,299.27

*Includes export shipments.

North Louisiana, Arkansas

By MITCHELL TUCKER

CLAIBORNE PARISH APPEARS CERTAIN OF GLEN ROSE POOL

SHREVEPORT, La., Dec. 28.—North Louisiana was virtually assured of a new oil field, as yet of undetermined proportions, when E. T. Oakes and H. D. Easton brought in their No. 1 Patton Estate, section 1-20-5w. This wildcat, bottomed in Lower Glen Rose at 5,379 feet, flowed by heads for several days, averaging from 2 to 5 bbls. of oil hourly, with some wash water. By the end of last week water had disappeared and after swabbing the well was flowing approximately 10 bbls. per hour through nine thirty-seconds inch choke.

Situated in Claiborne Parish about 6 miles north of the Sugar Creek gas field and about 10 miles east of Homer oil field, the discovery well appears to be on an anticlinal fold extending northward from the gas field, and some operators express the opinion that the two fields will eventually be connected. New locations are contemplated soon, and the Patton well appears to have definitely opened a new oil producing area. Practically all acreage surrounding the test is held by Oakes, Easton and independent associates.

Rodessa Production

Rodessa production again reached a new all-time peak, last week averaging 86,404 bbls. daily, 27,715 bbls. from Texas and 58,689 bbls. from the Louisiana side. The entire field still exhibits a deficiency however, as the per well average was 183 bbls., whereas the allowed is 225 bbls. per well per day.

Estimated Daily Production

Estimated daily gross production all companies week ending December 26:

NORTH LOUISIANA

	Bbls.
Bellevue	800
Caddo light	3,895
Caddo heavy	2,675
Converse	990
Cotton Valley heavy	260
Cotton Valley light	565
DeSoto and Red River	1,335
Elm Grove	340
Haynesville	3,270
Holly	140
Homer	2,565
Pleasant Hill	150
Rodessa	58,690
Sarepta-Carterville	435
Sligo	950
Urania	2,765
Zwolle	860
Total	80,685

SOUTH ARKANSAS

Champagnolle	2,115
El Dorado	2,100
Lisbon	290
Miller County	560
Nevada	795
Smackover light	2,110
Smackover heavy	17,520
Stephens	595
Troy	350
Urbana	1,575
Total	28,010

Texas side of Rodessa field—27,715 bbls. daily.

Rodessa Completions

United Gas No. 2 McCoy, SE SE NW section 16-23-16, flowed 16 bbls. hourly on initial test through three-eighths inch tubing choke, casing pressure 600 pounds, total depth 5,990 ft.

American Liberty No. 2 Sheppard, Lot 11, J. H. Rives Survey, Cass County, Texas, flowed 17 bbls. per hour through one-fourth inch tubing choke, saturation topped 5,970 feet, total depth 5,991 feet.

Bay Oil Co. No. 1 G. E. Parker, Greenham Survey, parallel fault completion 2 miles north of former producing area, flowed 2 bbls. hourly through one-sixteenth inch tubing choke, casing pressure 200 pounds, tubing pressure 80 pounds, 3,000,000 feet of gas, oil gravity 44 degrees, old total depth 6,116 feet, plugged back to 6,050 feet.

Gulf Production Co. No. 2 Dawson and others, J. H. Rives Survey, flowed 20 bbls. hourly through one-fourth inch tubing choke, saturation topped 5,987 feet, total depth 6,006 feet.

Magnolia Petroleum Co. No. 10 Rives, John Collum Survey, flowed 744 bbls. per day through one-fourth inch tubing choke, total depth 6,045 feet.

Phillips Petroleum Co. No. 3 Skinner, S.F.I.W Survey No. 1025, flowed 510 bbls. daily through one-fourth inch choke, ratio 486 to 1, total depth 6,001 feet.

Phillips Petroleum Co. No. 1 M. Wasson, W. R. Myers Survey, flowed 577 bbls. in 24 hours through one-fourth inch tubing choke, ratio 429 to 1, total depth 6,100 feet.

Bossier Parish

A 7,500-foot test is under consideration for the shallow Bellevue oil district by Shell Petroleum Co., who is reported to be negotiating for flank acreage here.

The Elm Grove gas field, just south of Sligo gas field, where oil was recently discovered on the southwestern flank, is coming in for active leasing, demand centering in township 16, range 12. Prices are ranging from $20.00 to $100.00 per acre, and deep flank tests of this region are probable soon after first of the year.

Caddo Parish

Bayou State No. 3 S. Jolly, NW NW SW section 22-22-15, routine completion in Hosston field, pumped 8 bbls. daily, total depth 1,050 feet.

Lincoln Parish

Caldwell Land and Timber Co. No. 1 Hammon, NW SE SW section 30-18-1w, which has been shut down at 665 feet for seven months, has been abandoned at this depth without further drilling.

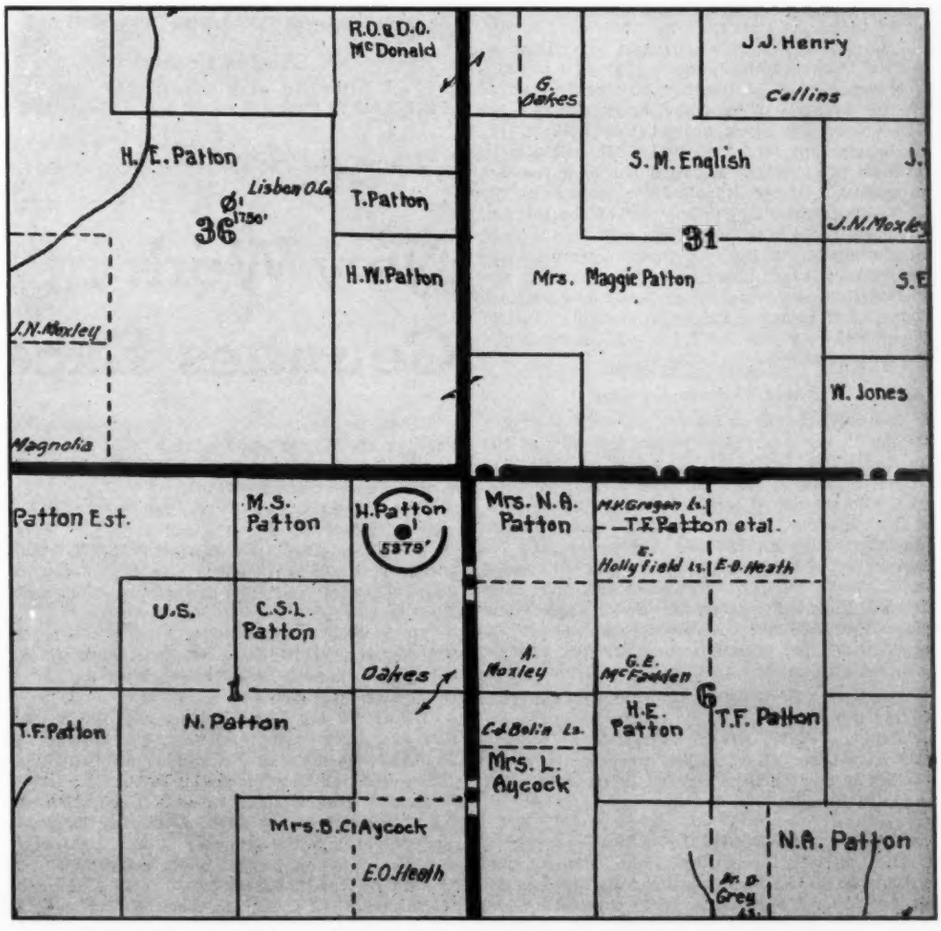
Union Parish

Interstate Natural Gas No. 58 fee, SE cor. 1-20-3e, northwestern side of Monroe gas field, gauged 8,000,000 feet of gas, rock pressure 815 pounds, total depth 2,206 feet.

Webster Parish

Woodley Petroleum No. 2-B L. C. Cox, SW SW section 23-21-10, flowed 120 bbls. of distillate

(Continued on Page 315)



Oakes and Easton discovery well, No. 1 Patton Estate, section 1-20-15, Claiborne Parish, Louisiana, 6 miles north of Sugar Creek gas field and about 10 miles east of Homer oil field.—(Globe Map Co., Shreveport)

East and East Central Texas

By
L. E. BREDBERG

HOLIDAY SLUMP IN EASTERN TEXAS; DEEP TESTS PLANNED

DALLAS, Tex., Dec. 26.—Five wells were added to the producing list in the Talco field in Titus County this week, and two more were put on production in the Sulphur Bluff pool, Hopkins County, the only two pools in the East Texas district producing from the Paluxy sand, upper member of the Trinity.

Two failures were reported in wildcat territory, one in Leon County and the other in Lamar County. The former was put down by J. B. Daniels and others on the M. K. Carter farm. It had previously swabbed some oil, but was given up at a total depth of 1,322 feet, trying for production from a shallow sand found at 1,292 feet. The latter test was junked and abandoned by J. Forrester and others on the Woodward farm. It topped the Paluxy at 3,060 feet and was given up at a total depth of 5,204 feet.

Another Test for Hunt

The Texola Land Corp. is planning to start a Trinity test 3 miles south of Wolfe City, Hunt County, on a 6,000-acre block taken by the company, which is headed by M. M. Friedemann of New York City. Contract calls for a 3,500-foot test, and C. C. Smith of Greenville will drill it. This block is about 15 miles north of Greenville, and in the northern part of the county, the Superior Oil Co. of California now preparing to sink a Trinity test 4½ miles northeast of Quinlan on a large block held by that company and Showers & Moncrief of Fort Worth. Another test slated for this county will be drilled by Stanolind Oil & Gas Co. on its block around Campbell, in the northeastern part of the county. It will also be taken to the Trinity. Location has been reported although not by the Stanolind company, as on the L. E. Moore farm 2½ miles west of the town of Campbell. The two latter tests will be the most interesting due to the fact that they are on the Mexia-Talco Fault plane on which there is production from the Woodbine at Mexia in Limestone County, and from the Paluxy at Sulphur Bluff in Hopkins County and the Talco field in Titus and Franklin counties.

Rains County Review

Probably the most interesting deep test now drilling in the East Texas district is that of the Humble Oil & Refining Co. and Tide Water Oil Co. on their large block in eastern Rains County. No. 1 Easter, in R. Hotchkiss Survey, 6 miles east of Emory, is now down below 4,925 feet, in shale and lime, with no anhydrite. The test topped the Paluxy at 6,079 feet, and the anhydrite is expected around 7,200 feet, throwing it low and precluding the possibility of getting the Rodessa pay zone within the 7,500 feet contracted to be drilled. It logged the Upper Glen Rose at 6,347 feet. Elevation is 438 feet.

The LaRue Brothers of Athens are planning on sinking a Trinity test in the LaRue area, eastern Henderson County, where several dry Woodbine tests have been drilled within the past six years. A block is now being assembled in the area with that idea in mind.

Completing Line

The American Liberty Pipe Line Co. is expected to complete its 18-mile 6-inch line from the Sulphur Bluff field in Hopkins County to the Talco field in Titus County, this week. This line will tie into tanks in the latter field, the Humble Pipe Line Co. to take the Sulphur Bluff oil at Talco and move its southeast through its Talco-Longview line in the East Texas field, where the American Liberty Oil Co. will again pick it up. The latter company has an 8-inch trunk line out of the East Texas field to Houston, and can move the Sulphur Bluff oil to the Gulf Coast if desired.

The Humble Pipe Line Co. has added three new main line stations on its 65-mile 8-inch line from the Talco field in Titus County to Longview on its Van-East Texas-Shreveport main line. This was necessary in order to move the low-gravity Talco crude through the line during cold weather. The capacity of the line was around 8,000 bbls. per day until lower temperatures caused trouble in moving the viscous crude through the line, the capacity falling off to about 50 per cent. These new stations however, will again raise its capacity, although the oil is expected to need heating. Working pressure is 700 pounds.

COMPLETIONS IN EAST CENTRAL TEXAS

Hopkins County—Sulphur Bluff

Empire Oil & Refining Co. No. 1 J. E. Worsham, top saturated sand 4,502 feet, top Paluxy 4,475 feet, total depth 4,550 feet, sand, 36 bbls. per hour, 2½-inch tubing.

Hager and others No. 1 J. C. Reynolds, top oil sand 4,473 feet, top Paluxy 4,426 feet, total depth 4,508 feet, sand, 45 bbls. per hour, 2½-inch tubing.

Houston County

F. D. Akin No. 1 G. Q. King, Trustee, total depth 2,127 feet, water sand, dry and abandoned.

Leon County

J. B. Daniels and others No. 1 M. K. Carter, total depth 1,322 feet, dry and abandoned, tested fresh water.

Lamar County

No. 1 J. Forrester and others No. 1 Woodward, total depth 5,204 feet, top Paluxy 3,060 feet, junked and abandoned.

Titus County—Talco Field

K. & A. Oil Co. (formerly G. M. W. Oil Co.) No. 1-31 Talco Townsite, top sand 4,264 feet, total depth 4,335 feet, swabbing 28 bbls. per hour. Humble Oil & Refining Co. No. 22 King & Hughes, top sand 4,204 feet, total depth 4,332 feet, pumped 98 bbls. in 14 hours. Magnolia No. 4 C. M. Carr, top sand 4,190 feet, total depth 4,260 feet, pumped 430.9 bbls. in 24 hours; No. 6 W. H. Crawford, top sand 4,167 feet, total depth 4,320 feet, pumped 18 bbls. per hour; No. 7 W. H. Crawford, top sand 4,185 feet, total depth 4,303 feet, pumped 335.7 bbls. in 24 hours, 4 per cent b.s. and w.

Increase in Allowable

The Talco field was given an increase in daily allowable by the Railroad Commission of Texas to 12,096 bbls. for January 1. This is an increase of 1,880 bbls. per day. Recent completions will absorb this increase however. No new per-well allowable has been assigned the wells. The Sulphur Bluff pool in Hopkins County will also be given a daily increase the first of the year. Its allowable was raised from 450 to 750 bbls. per day, new wells absorbing this increase.

Some producers in the East Texas field are expecting a crude price increase this week, believing that at least 15 cents per barrel will be added to the now posted price.

New Work in Seven Michigan Counties Exceed Completions

MOUNT PLEASANT, Mich., Dec. 28.—The average daily production of the Michigan fields dropped to 27,299 bbls. in the past week, owing in part to the Christmas holidays.

Completions of the week numbered 11 and were as follows:

D. F. Jones No. 1 Doane, SW SW NW section 33-18n-1e, Gladwin Coounty, was dry and abandoned at 3,699 feet. It had topped Dundee at 3,509 feet.

Muskegon Development Co. No. 1 Windam, SW SW SE section 13-18n-1e, Gladwin County, was dry and abandoned at 3,677 feet, with top of the Dundee at 3,513 feet.

Weber Oil Co. No. 1 Boeing, NE SW SE section 36-22n-2e, Ogemaw County, had Dundee at 2,466-2,617 feet, total depth, and after a 1,500-gallon acid treatment started at 50 bbls. per day.

Newell & Waughter No. 1 Cortland, 498 feet south and 909 feet west of C section 19-22n-2e, made a 60-bbl. initial producer after a 1,000-gallon acid treatment, total depth 2,746 feet, with pay at 2,708-16 feet and 2,725-43 feet.

Burnstein Oil & Gas Co. No. 1 Kirker, SE SW NW section 36-11n-5w, Montcalm County, had Dundee at 3,211-12 feet, total depth, and started at 200 bbls. a day naturally.

Pure Oil Co. No. 26 Narmore, SW SE NE section 16-13n-1w, Midland County, was acidized at 3,367-3,421 feet and flowed 170 bbls. of oil and 300 bbls. of water in 24 hours.

Mammoth Producing & Refining Co. No. 6 Thayer, NE SW NW section 23-16-4w, Isabella County, started at 590 bbls. a day after a 1,000-gallon acid treatment at 3,715-18 feet.

Wiser Oil Co. No. 2 Townsend, C NE NW section 10-10n-4w, Gratiot County, is a 7,500,000-foot gasser from Stray sand at 969-75 feet.

E. J. Turner No. 1 Haas, C W half NW NE section 6-4n-3e, Livingston County, was dry and abandoned.

West Michigan Consumers Co. No. 1 Bassett and others, SW cor. NE SW section 8-9n-14w, Muskegon County, had Berea sand at 1,179-97 feet and shot it with 40 quarts of nitroglycerin. It responded with a gas production of 1,039,500 feet.

New work reported in the state included the following operations:

Robert C. Lentz, Trustee No. 1 Raab, NW SW SW section 16-4n-13w, Allegan County, drilling at 90 feet.

Lee Brown No. 1 Kehrl, NW NW NE section 12-1s-7e, Washtenaw County, rigging up.

H. E. Bell No. 1 Delo, SE SW SW section 17-3n-5w, Eaton County, a wildcat rigged up.

Bellawinder and others No. 1 Miller & Witt, C

SW section 18-9n-14w, Ravenna district, Muskegon County, rigging up.

A. S. Cochran No. 4 Durham, SW SE SW section 15-10n-16w, Muskegon district, set 10-inch casing at 80 feet.

Miller and others No. 1 Techima, C NW section 13-9n-15w, Ravenna district, set 8⅝-inch casing at 190 feet.

West Michigan Consumers Co. No. 1 Jackson, C NW section 8-9n-14w, set 8⅝-inch casing at 126 feet.

Rowmor Corp. No. 1 Leiter, NE NE SW section 33-15n-6w, Sherman district, Isabella County, location.

Pure Oil Co. No. 1 Fenby, C S half NW SE section 33-14n-2w, Midland County, rig up.

Henry B. Cowdray No. 1 Devuyst, SE SE SW section 11-10-2w, Gratiot County, rig up.

M. J. Ingold No. 3 Zittle, NW SW SW section 13-22n-1e, Ogemaw County, driving 10-inch casing at 340 feet.

Devonian Oil Co. No. 1 Crandall, NW SE SW section 10-20n-4e, Richland-Clayton district, Ogemaw County, 10-inch pipe set at 185 feet.

Dunnigan & Fothergill No. 1 Christman, SE SE SE section 19-22n-2e, Ogemaw district, location.

Strange & Fortney No. 2 State B, NW NE NE section 1-21n-2e, Ogemaw County, deepening from 1,805 feet; drilling at 2,055 feet.

J. W. Moore No. 1 Griffin, NE NE SW section 29-22n-2e, Ogemaw County, location.

Oklahoma Fields

(Continued from Page 302)

doned. Black Gold Oil Co. No. 2 Cooley, SW SW SE section 25-28-4e, wildcat, was an abandoned location.

Lincoln County

The only completion in Lincoln County was R. L. Kemp and others No. 1 Stites, NW cor. section 28-17-5. It topped first Wilcox sand at 4,142 feet; second sand, 4,177 feet, salty; total depth, 4,129 feet, dry and abandoned.

Skelly Oil Co. was digging pits at No. 1 Laughlin, C SE NW section 29-17-3, wildcat about 1 mile west of the same operator's No. 1 Sporn, gas discovery well.

Hughes County

The Texas Co. No. 1 Aetna Life, C NE NW section 9-8-10, Hughes County, topped Cromwell sand at 3,113 feet; total depth, 3,192 feet; bailed water; plugged back to 3,185 feet, produced 8,500,000 feet of gas and was completed.

Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 1 Harris D, SW NW NE section 8-6-8, topped Wilcox sand at 4,257 feet; total depth, 4,261 feet, and was dry and abandoned.

Young, Harrison and others No. 1-A Tims, NW SE NE section 11-9-9, topped sand at 1,543 feet; had a hole full of water at 1,68 feet, total depth, and was dry and abandoned.

First reports of new work in Hughes County: Manahan Oil Co. No. 7 Oliphant E, SW SW NW section 1-9-8, cellar; same operator's No. 2 Oliphant F, NE NE SE section 2-9-8, location; C. J. Wrightsman No. 1 Diamond, NE NE SE section 33-9-9, building rig; Marbett Oil Co. No. 1 Breeding, NW NW NE section 12-7-8, rig.

Coal County

Shell Petroleum Corp. No. 4 Hill A, C NW section 30-3-10, Coal County wildcat, was dry and abandoned at 5,902 feet, total depth. It topped Mayes at 5,030 feet; Woodford, 5,087 feet; Hunton lime, 5,252 feet; Sylvan, 5,348 feet; Viola, 5,427 feet; sand, 5,768 feet; Bromide, 5,587 feet; McLish, 5,684 feet.

The old new work reported in Coal County was at Ruwoldt & Couch No. 1 McMillan, SW cor. section 10-1s-8, a location.

Choctaw County

Cooper & Branstetter had built rig and were moving in tools for No. 1 Bell, C NW NE section 29-6s-17e, wildcat near Hugo in Choctaw County.

Jefferson County

Bridwell Oil Co. No. 7 Wahlgemuth, SE SE NW section 30-6s-5w, Spring area, Jefferson County, had sand at 1,498-1,512 feet; total depth, 1,529 feet; pumped 25 bbls. of oil in 24 hours and was completed.

Mid-Continent Oil Co. No. 1 Reid, C SW NW section 32-6s-4w, wildcat in southeastern Jefferson County, was dry and abandoned at 1,807 feet, total depth, in shale.

Bridwell Oil Co. No. 4 Barnett, SW SW NE section 30-6s-5w, was a rig. The Jefferson County wildcat originally reported as Lake & Moore No. 1 Derr, later was designated as Lincoln Oil Co. No. 1 Derr, NW NW SE section 13-5s-8w. It had spudded with rotary tools.

Southwestern Oklahoma

Raizen Brothers No. 7 Price, NW SE SW section 10-3s-5w, Stephens County, was completed at 1,459 feet, total depth, pumping 4½ bbls. of oil in 24 hours. Gulf Oil Corp. No. 2 Bowers, NE NW SW section 13-2s-4w, an old well, was not to be deepened at this time, as previously announced. George L. Pace and others No. 1 Branch, SW NW SW NE section 12-2s-8w, was drilling at 1,450 feet. Armor Oil & Gas Co. No. 2 Montgomery, NW NW SE section 11-2s-8w, was drilling at 1,435 feet in shale.

Ohio Oil Co. No. 2 Rowe, SE NW NE section 36-6-10w, Cement area, Caddo County, was dry and abandoned at 6,958 feet, total depth, in shale.

Charles F. Newson No. 1 Wilson, C SW NW section 17-4s-11w, wildcat in Cotton County, was dry and abandoned at 4,218 feet, total depth, in lime.

Gulf Oil Corp. was rigging up rotary tools at No. 7 Boucher, NE NW SW section 32-1n-19w, Tipton area, Jackson County.

Southwest Texas Fields

(Continued from Page 309)

some days ago was being tested at latest reports by the Hiawatha Oil Co. The company's No. 6 Griffith, located in Survey 416, cored the sand at 6,749-59 feet and was setting casing at 6,770 feet. The sand was cored in the Glasscock No. 2 Hunter showing gas and oil at 6,741 feet, but the test was plugged back to the 4,400-foot Clarkwood sand and completed. Oil production, if found in this new deep sand, will incite further deep drilling in the field. It is the second sand to show production below the prolific Frio or 5,800-foot horizon, the other being the 6,300-foot sand which is now producing several wells.

In the latter sand, the Phillips Petroleum Co. completed No. 5 Hutchins for a small initial production, and casing and tubing pressures of 2,400 and 2,000 pounds respectively. Other completions were made in the 5,800-foot Frio sand and the 4,400-foot Clarkwood sand. Bryant and Howell No. 1 Kocurek, located about 1 mile south of Clarkwood, was making small amounts of gas and oil after having blown out and cratered several days ago.

Flour Bluff Field

Drilling continues steadily in the Flour Bluff field, considered to be one of the largest potential production areas in the district. An important outpost test will get under way shortly as Teague and others resume operations on the former Hurlburt No. 1 Poenisch, located in Lot 2, Block 32, across the Oso Creek from the producers in Flour Bluff at present. The test is a workover, and will be carried to the 6,600-foot Frio sand producing in Flour Bluff, constituting a most important wildcat.

Prospects for a new producing area in Nueces County were being watched during the week, as the Wellington Oil Co. No. 1 Stockton plugged back from a total depth of 7,000 feet to test sands cored at shallower depths. The 6,200-foot horizon will be tested first, it is reported. The wildcat, started by Cosner and Fearis in the latter part of October, was later taken over by Cosner and Cosner, and finally transferred to the Wellington Oil Co. At 4,720-26 feet a drill stem test recovered 700 feet of oil and other sands were cored at 4,841-47 feet and at 6,200 feet but were not tested. The wildcat is located 12 miles southwest of Corpus Christi in section 25 of the Laureles Farm Tracts.

Other important showings were attracting the attention of operators to San Patricio and Aransas counties. In the former, the Plymouth Oil Co. cored a new deep sand at 6,115-19 feet in No. 65-C Welder, and was testing at latest reports. The test is located in the Plymouth field, in SW section 50. A production gauge on the Atlantic Refining Co. No. 1-C McCampbell, Aransas County well, in the McCampbell field, showed that well to be one of the best in the area. The Barnsdall Oil Co. No. 1 Edwards, drilling below 5,200 feet in the vicinity of Lamar, Aransas County, is being closely watched by other operators interested in the area. The coastal section of the county near Lamar and Rockport has been the scene of considerable geophysical surveying and leasing recently.

Laredo District

Outstanding development in the Laredo district during the week was the indicated 2½-mile extension to the Hoffman field in Duval County. The Argo Oil Co. and John Clopton No. 1 Smith Corkill, in section 61, cored soft sand at 2,841-46 feet with a good show of oil. Whether the test will open commercial production, or constitute an extension or new producing area, remains for further drilling. The wildcat is located south of production in the Hoffman field, which was just recently extended considerably to the east.

Louisiana-Arkansas Fields

(Continued from Page 313)

and 8,000,000 feet of gas daily from the Holloway sand 5,537-41 feet in the Cotton Valley field, three-fourths inch tubing choke, tubing pressure 450 pounds, total depth 5,557 feet.

ARKANSAS

Miller County

Odell Hinson No. 1 Montana Realty Co., NE NW NW section 3-17-28, 8 miles south of Texarkana, after testing salt water at total depth of 5,278 feet, drilled deeper and at 5,325 feet dropped drill stem and was unable to recover by fishing. Well is now shut down awaiting orders.

Pumping equipment is being installed at C. V. Lenz No. 7 Dale, 15 miles west of Texarkana, to test the 2,200 feet of oil now standing in hole, total depth 4,215½ feet.

Nevada County

Benedum-Trees No. 1 Fincher, NW SW NE section 10-14-20, Troy field, pumped and flowed 1,043 bbls. of clean oil first 24 hours, 1,030 bbls. second 24 hours and 1,027 bbls. in third 24 hours, oil gravity 20.8, total depth 2,150 feet. Well is now shut down for storage. This is the most prolific producer from the basal Upper Cretaceous horizon at Troy.

L. M. Glasco No. 1 Ritchie, NW NW SE section 10-14-20, was completed in the Nacatoch sand horizon, pumping 55 bbls. per day of clean oil, 14.8 gravity, from sand 1,269 feet to 1,271 feet, total depth.

Ouachita County

J. D. Reynolds completed his No. 2 M. V. Levehon, NW SE SW section 36-15-16, northern flank of the Louann portion of Smackover field, pumping 10 bbls. of oil daily, total depth 2,014 feet.

EAST TEXAS (Border Counties)

Panola County

Magnolia Petroleum Co.'s new gas-distillate well about 3 miles south of the Glassell discovery, E. A. Hull No. 1, Thomas Applewhite Survey, gauged 2,300,000 feet of gas on open flow through 2½-inch tubing, shut-in pressure 2,675 pounds on tubing and 2,710 pounds on casing. Total depth 5,960 feet in basal Glen Rose. Well has been shut in.

Eastern Fields

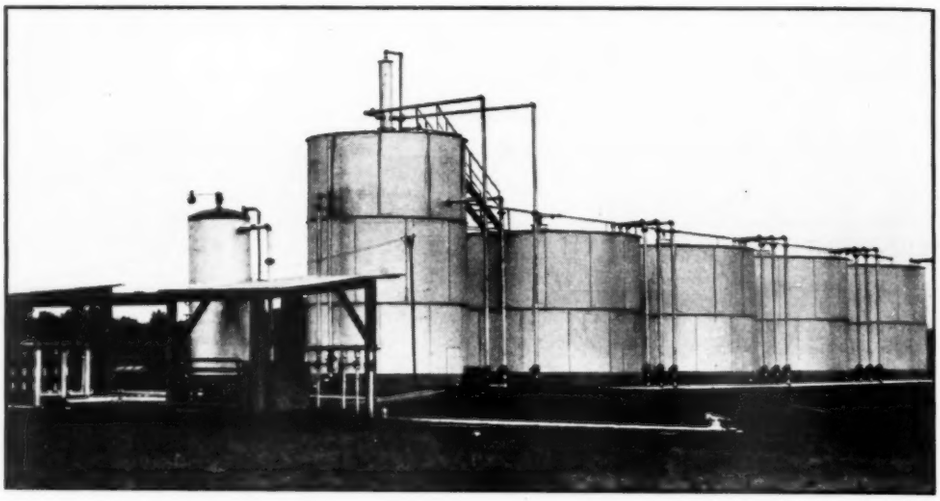
(Continued from Page 308)

ing will be done on this lease. In this district, Boggess and Starcher drilled a test on the Fred Hudson and others lease through the Salt sand to 1,587 feet and it was dry.

In Walton district, Roane County, Paul Weekley and others completed a test on the Linnie Cummings farm at 2,060 feet as a gas well. The Big Lime was at 1,870-2,014 feet; Big Injun 2,014-2,052 feet with 149,000 feet of gas at 2,024-48 feet.

Flank Production at New Iberia Climaxes 20 Years of Effort

By F. L. SINGLETON



Tank battery on Bolivar lease, New Iberia field

NEW IBERIA, La., Dec. 28.—After 20 years of an unsuccessful development program, carried on spasmodically since 1916 by major and independent companies, prolific flank production has been uncovered at the New Iberia field in Iberia Parish and this old salt dome is now one of the most active along the Louisiana Gulf Coast.

The New Iberia field is approximately 7 miles southeast of the town of New Iberia, centering in sections 52, 54, 56 and 71-7e-12s, 2 miles north of Bayou Teche, in the northwestern part of the parish. Paraffin beds and gas seeps led to discovery of the structure first explored by Gulf Oil Corp. and New Iberia Oil Co. No. 1 Bernard completed in July 1917 from 6 feet of caprock bottomed at 1,078 feet with an initial production of 125 bbls. per day. Gulf Oil Corp. drilled in the immediate area of discovery, but soon brought its operations to a close after rapid decline in production had been made in six wells completed at a maximum depth of 2,900 feet.

In 1935 William Helis, an independent operator of New Orleans who previously had opened flank production at the Leesville field, purchased the Bernard 60-acre lease from Y. D. Spell which had been condemned by two dry holes. His first test, No. 3 Bernard, drilled under the name of Canal Oil Co. opened production from a deeper sand bottomed at 4,737 feet with an initial production of 2,500 bbls. per day. It was completed in 80 feet of sand and, although flowing approximately 2,500 bbls. of oil per day for two years, it has not lost a pound of its original pressure, making it one of the best producers completed on the Gulf Coast.

After making a careful study of subsurface conditions of each well drilled on the southeast flank, Mr. Helis in 1936 leased the Bolivar tract on the west flank and made location for No. 1 Bolivar approximately 1 mile west of No. 3 Bernard completed in April from 105 feet of sand bottomed at 4,490 feet. A second location was made for No. 2 Bolivar and it cored 140 feet of sand before it was completed at 4,009 feet, flowing 1,000 bbls per day.

There are 4 producing wells on this lease, each having a daily potential of 1,100 bbls. through a three-eighths inch choke produced from four different horizons The average pressure of each well is 500 pounds and the oil ranges about 24-26 degrees which conforms with the gravity from other wells throughout the field.

The salt structure at New Iberia is probably more irregular than any other known dome in the district which accounts for the numerous producing horizons, as well as the thickness and thinness of the sand in the various wells. To date none of the wells have been drilled through the salt, consequently there is a possibility future development may develop production from an "overhang." The upward movement of the salt through the overlying formations has shoved the producing sands in a perpendicular position with the soft bed which no doubt is the reason for the quantity of oil sand cored in several wells on the Bolivar lease.

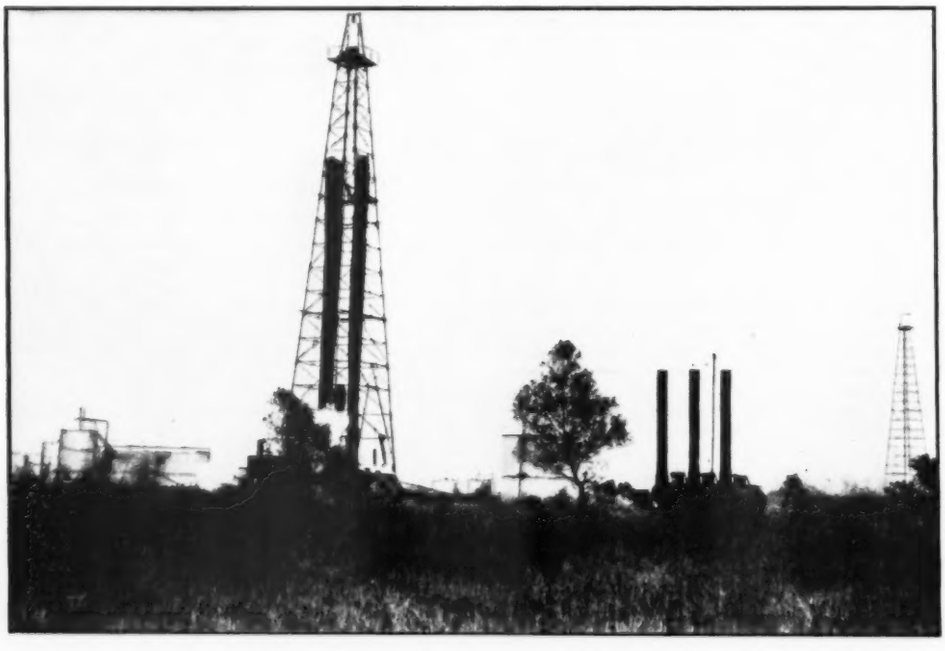
A record of the completed wells on the southeast flank shows there are four wells producing sand at 4,500, 4,700, 3,800 and 5,400 feet and no salt is known to have been encountered. On the west flank there are nine wells producing from six horizons bottomed at 4,000, 4,500, 3,966, 4,400 and 4,600 feet with salt being found in No. 1 Bolivar at 4,766 feet, No. 1 Gulf fee at 3,669 feet and No. 1 Bullock at 3,862 feet. On the northwest flank three wells are producing from a 6,700-foot sand with no salt reported, although a short distance southeast No. 1 Schwing was abandoned in salt at 4,778 feet.

A recent production report listed 14 producing wells making a daily average production of 8,980 bbls. The producing area extends approximately 1¼ miles southeast to the west flank along the north and south axis of the dome. From the development thus far, it appears the largest production will be confined to the west and southeast flanks although there is always the possibility of deeper sands being uncovered around any salt dome type of structure. In this field developments for the time being are expected to be confined to the Miocene sand due to a troublesome thick section of heaving shale encountered by several outpost wells on the southwest, north and northeast.

The New Iberia field is situated in the swamps surrounding Little Bayou which in most cases have curtailed any large drilling program in the proven fields of the district. For this reason the systematic development being carried on by William Helis who operates four of his own rigs is most interesting. A 2-mile shell road has been laid to the edge of the swamp where a well-constructed plank road has been laid on top of a road bed about 4 feet above the water level.

Each lease is equipped with a tank battery of four 500-bbl. tanks and one 1,000-bbl. gunbarrel tank. The oil from each lease is connected with a 4-inch gathering line that ties into a 6-inch main line extending 2 miles to Bayou Teche where it is stored in two 25,000-bbl. storage tanks for shipment by barge to New Orleans. The oil is pumped to storage by steam-driven pumps, powered by one 85-pound horsepower boiler set up at each lease. Water for the boilers is supplied by a deep water well at the field office.

Drilling operations are in charge of George J. Helis, general superintendent, assisted by J. J. Hooper, field superintendent.



Drilling-in out in the marshes near Little Bayou

WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Associated Oil Co., No. 1 Capitan, Santa Barbara Co.	2- 4-30	2,450	P.B. 2,365
Barnsdall-Rio Grande, No. 2 Elwood, Santa Barbara	15- 4-29	2,711	pump. 70 b.d.
Bush Oil Co., No. 3 Santa Maria, Santa Barbara Co...	30-10-33	5,429	P.B. 4,700
Shaffer, W. D., No. 1 Santa Maria, Santa Barbara Co.	9- 9-33	1,641	sd. sh. drlg.
Apache Oil Co., No. 1 Santa Maria, Santa Barbara Co.	31- 9-33	4,996	P.B. 4,143
Macrate, A. N., No. 2 Santa Maria, Santa Barbara Co.	26-10-34	971	sd. sh. drlg.
Echo Oil Co., No. 1 Santa Maria, Santa Barbara Co. ..	23-10-34	3,016	O.S. drlg.
Union Oil Co., No. 12 Santa Maria, Santa Barbara Co.	24-10-34	1,514	sd. sh. drlg.
Union Oil Co., No. 13 Santa Maria, Santa Barbara Co.	24-10-34	744	sd. sh. drlg.
Union Oil Co., No. 16 Orcutt, Santa Barbara Co. ...	26- 9-34	3,751	bailing
101 Oil Co., No. 1 Pt. Concepcion, Santa Barbara Co.	35- 5-33	396	idle
Petrol Corp., No. 1 Los Alamos, Santa Barbara Co. ..	9- 8-32	201	cmtd. 150
Moore, Inc., No. 1 Santa Maria, Santa Barbara Co. ...	25-10-35	8,021	fish. D.P.
Nine Springs Oil Co., No. 1 Los Olivos, Santa Barbara	9- 7-30	3,080	rigging up
Dietzman, J., No. 1 Carpenteria, Santa Barbara Co. ..	8- 4-25	1,025	rigged up
Fisher, Dan, No. 1 Cuyama, Santa Barbara Co.	28-11-28	631	sd. sh. drlg.
Merchants Pet. Co., No. 7 Sespe, Ventura Co.	1- 4-20	397	hd. sd. drlg.
Condor Oil Co., No. 1 Sespe, Ventura Co.	6- 4-19	1,470	sd. sh. drlg.
Topa Topa Oil Co., No. 1 Sespe, Ventura Co.	33- 5-19	3,200	sd. sh. drlg.
Speik Oil Co., No. 2 Sespe, Ventura Co.	33- 5-19	1,432	hd. sh. drlg.
Oil Ridge Oil Co., No. 1 Hopper Canyon, Ventura Co.	6- 4-18	2,772	pump. water
Bolsa Chica Oil Co., No. 4 Temescal, Ventura Co. ...	4- 4-18	4,550	sd. sh. drlg.
Pacific Western Oil Co., No. 7 Temescal, Ventura Co.	4- 4-18	2,332	hd. sh. drlg.
Associated Oil Co., No. 1 Wiley Canyon, Ventura Co...	6- 3-18	3,130	hd. sd. drlg.
Munding, J. J., No. 1 Ojai, Ventura Co.	22- 4-22	1,114	br. sh. drlg.
Vaca Oil Co., No. 1 Oxnard, Ventura Co.	6- 1-21	2,822	fish. swab
Continental Oil Co., No. 1 Red Mountain, Ventura Co. .	7- 3-23	3,675	hd. sd. drlg.
General Pet. Corp., No. 1 Padre Canyon, Ventura Co.	15- 3-24	4,917	cleaning out
C. C. M. Oil Co., No. 2 Padre Canyon, Ventura Co. ...	23- 3-24	5,211	br. sh. drlg.
Honolulu Oil Corp., No. 1 South Mountain, Ventura Co.	23- 3-21	5,582	gr. sd. drlg.
Calco Pet. Corp., No. 4 South Mountain, Ventura Co.	17- 3-20	2,636	cable tools
Associated Oil Co., No. 27 Hartman, Ventura Co.	22- 3-23	4,531	hd. sd. drlg.
Associated Oil Co., No. 12 McGonigle, Ventura Co. ...	23- 3-23	10,007	cmtd. 10,007
Associated Oil Co., No. 78 Lloyd Ventura, Ventura Co.	27- 3-23	4,695	cmtd. 4,690
Shell Oil Co., No. 89 Taylor Ventura, Ventura Co. ...	30- 3-23	4,689	sd. sh. drlg.
General Pet. Corp., No. 17 Barnard Ventura, Ventura	23- 3-23	5,386	reaming
Continental Oil Co., No. 6 San Miguelito, Ventura Co.	24- 3-24	2,561	sd. sh. drlg.
General Pet. Corp., No. 5 Rincon, Ventura Co.	tideland	1,380	sd. sh. drlg.
Den Petroleum Co., No. 1 Devils Den, Kern Co.	20-25-19	2,100	hd. sd. drlg.
Long, H. C., No. 1 Devils Den, Kern Co.	20-25-19	921	idle
Lube Oil Co., No. 1 Devils Den, Kern Co.	2-25-18	1,174	hd. sh. drlg.
Associated Oil Co., No. 8-A-3 Lost Hills, Kern Co. ...	11-26-20	953	sd. sh. drlg.
Standard Oil Co., No. 2 Lost Hills, Kern Co.	2-26-20	1,592	bailing
Texas Co., No. 1 Lost Hills, Kern Co.	11-26-20	1,958	pump. water
Welport Oil Co., No. 16 McKittrick, Kern Co.	26-29-21	1,110	sd. sh. drlg.
Woodward, Hoke, No. 6 McKittrick, Kern Co.	11-30-21	1,317	P.B. 1,167
Bergman, H. L., No. 1 McKittrick, Kern Co.	30-30-22	1,690	pump. water
Peters Royalty Corp., No. 2 McKittrick, Kern Co.	32-29-22	1,221	sd. sh. drlg.
Continental Oil Co., No. 1 Wasco, Kern Co.	8-27-23	6,503	will cmt.
Belridge Oil Co., No. 12-1 North Belridge, Kern Co. ...	1-28-20	7,900	br. sh. drlg.
Belridge Oil Co., No. 14-35 North Belridge, Kern Co. ..	35-27-20	5,096	sd. sh. drlg.
Belridge Oil Co., No. 15-35 North Belridge, Kern Co. ..	35-27-20	7,677	hd. sd. drlg.
Union Oil Co., No. 20 North Belridge, Kern Co.	36-27-20	8,510	P.B. 8,462
Milburn, E. B., No. 1 Kern Front, Kern Co.	10-28-27	2,230	pump. 180 b.d.
National Oil Co., No. 3 Universal, Kern Front, Kern	11-28-27	1,650	sd. sh. drlg.
Honolulu Oil Corp., No. 59 Kern Front, Kern Co.	8-28-27	2,498	sd. sh. drlg.
M. H. Whittier Co., No. 2 Kern Front, Kern Co.	16-28-27	2,868	cleaning out
Bishop Oil Co., No. 9 Kern Front, Kern Co.	23-28-27	1,151	sd. sh. drlg.
Calif. Star Oil Co., No. 7-40 Kern Front, Kern Co. ...	22-28-27	2,320	O.S. drlg.
Italo Pet. Corp., No. 35 Cauley, Kern Front, Kern Co.	16-28-27	2,848	redrlg. 2,478
Standard Oil Co., No. 2-9 Kern Front, Kern Co.	9-28-27	2,002	sd. sh. drlg.
General Pet. Corp., No. 15 Wetmore, Kern Front, Kern	14-28-27	2,017	pump. 120 b.d.
General Pet. Corp., No. 42 Young, Kern Front, Kern	14-28-27	1,934	sd. sh. drlg.
Hope Oil Co., No. 1 Kern River, Kern Co.	8-29-28	1,800	gr. sd. drlg.
Roscoe & Stanley, No. 1 Premier, Kern Co.	29-27-27	2,660	bailing
Framac Oil Co., No. 3 Premier, Kern Co.	22-27-27	784	sd. sh. drlg.
Jeffries, J. J., No. 1 Premier, Kern Co.	7-27-27	431	sd. sh. drlg.
Ring Oil Co., No. 29-1 Dominion, Kern Co.	29-26-28	1,262	sd. sh. drlg.
Texas Co., No. 11 Vedder, Mount Poso, Kern Co. ...	4-27-28	1,833	pump. 510 b.d.
Transit Oil Co., No. 1 Glide, Mount Poso, Kern Co. ...	33-27-28	1,251	sd. sh. drlg.
Petroleum Securities, No. 2 Mount Poso, Kern Co. ...	34-27-28	1,670	pump. 60 b.d.
C. C. M. Oil Co., No. 3 Dorsey, Mount Poso, Kern Co.	26-27-28	1,520	cleaning out
Doyle Pet. Co., No. 1 Jasmine, Kern Co.	15-25-27	2,882	pump. 5 b.d.
Kelly, Paul, No. 1 Fruitvale, Kern Co.	23-29-27	3,160	cmtd. 3,109
Western Gulf Oil Co., No. 34 Fruitvale, Kern Co.	21-29-27	5,130	gr. sd. drlg.
Western Gulf Oil Co., No. 35 Fruitvale, Kern Co.	22-29-27	4,875	will P.B.
Western Gulf Oil Co., No. 36 Fruitvale, Kern Co.	22-29-27	3,690	gr. sd. drlg.
Calif. Star Oil Co., No. 2 Fruitvale, Kern Co.	21-29-27	3,795	cmtd. 3,793
Omar Oil Co., No. 1 Fruitvale, Kern Co.	21-29-27	4,164	test wet
Linderman Oil Corp., No. 1 Fruitvale, Kern Co.	28-29-27	4,333	P.B. 4,235
Tarr & McComb, No. 4 Fruitvale, Kern Co.	23-29-27	3,179	cleaning out
Trico Oil & Gas Co., No. 1 Mountain View, Kern Co. ...	13-30-28	5,000	cleaning out
Hogan Pet. Co., No. 2 Peters, Mountain View, Kern Co.	5-31-29	6,168	fish. liner
Hogan Pet. Co., No. 2 Symons, Mountain View, Kern	4-31-29	6,095	flow. 2,000 b.d.
Hogan Pet. Co., No. 9 Porter, Mountain View, Kern Co.	29-30-29	6,098	completing
Buffalo Oil Co., No. 5 Mountain View, Kern Co.	19-30-29	2,651	sd. sh. drlg.
Standard Oil Co., No. 3 C. L., Mountain View, Kern Co.	13-30-28	4,854	hd. sd. drlg.
Standard Oil Co., No. 3 Mabry, Mountain View, Kern	18-30-28	2,940	sd. sh. drlg.
Mid-State Oil Co., No. 1 Mountain View, Kern Co. ...	19-30-29	4,880	flow. 490 b.d.
Mohawk Pet. Co., No. 3 Hood, Mountain View, Kern Co.	30-30-29	8,000	deep test
Hillman & Long, No. 1 Mountain View, Kern Co.	34-30-29	1,872	sd. sh. drlg.
Wood-Callahan Oil Co., No. 2 Mountain View, Kern Co.	24-30-28	5,261	completing
Berry Holding Co., No. 4 Edison, Kern Co.	10-30-29	1,926	O.S. drlg.
East Edison Oil Co., No. 1 Edison, Kern Co.	23-30-30	1,035	bailing water
Mohawk Pet. Co., No. 2 Earl, Arvin, Kern Co.	10-31-29	6,166	pump. 200 b.d.
General Pet. Corp., No. 1 Arvin, Kern Co.	26-31-29	7,462	recmtd. 6,570
Shell Oil Co., No. 1 Arvin, Kern Co.	15-31-29	6,171	salt water
Arkelo Oil Co., No. 1 Lerdo, Kern Co.	23-28-26	7,051	sd. sh. drlg.
Associated Oil Co., No. 1 Rio Bravo, Kern Co.	30-29-25	7,683	cmtd. 7,358
Standard Oil Co., No. 11-1 Rosedale, Kern Co.	19-29-26	7,807	flow. 2,750 b.d.
Shamrock Oil Co., No. 6 Round Mountain, Kern Co. ...	6-28-29	1,567	P.B. 1,561
C. C. M. Oil Co., No. 7 Round Mountain, Kern Co. ...	6-28-29	1,707	dry; abd.
California Western Oil, No. 19 Round Mountain, Kern	7-28-29	1,590	O.S. drlg.
Trans-Line Oil Co., No. 1 San Emidio, Kern Co.	3-10-23	951	hd. sh. drlg.
Bender, E. A., No. 1 San Emidio, Kern Co.	14-10-23	1,236	P.B. 900
Standard Oil Co., No. 9-1 Ten Section, Kern Co.	34-30-26	8,585	sd. sh. drlg.
Standard Oil Co., No. 10-1 Ten Section, Kern Co.	26-30-26	8,900	dry; abd.
Shell Oil Co., No. 34 Ten Section, Kern Co.	29-30-26	7,390	sd. sh. drlg.
Superior Oil Co., No. 8 Ten Section, Kern Co.	11-30-26	8,530	gr. sh. drlg.
British-American, Inc., No. 1 Ten Section, Kern Co.	21-31-27	650	idle
C. C. M. Oil Co., No. 24-21 Midway-Sunset, Kern Co.	21-32-23	2,700	sd. sh. drlg.
C. C. M. Oil Co., No. 25-21 Midway-Sunset, Kern Co.	21-32-23	1,771	sd. sh. drlg.
C. C. M. Oil Co., No. 1-J Midway-Sunset, Kern Co. ...	21-32-23	2,095	fish. D.P.
Associated Oil Co., No. 61-A Midway-Sunset, Kern Co.	35-31-22	1,000	rig. to pump
General Pet. Corp., No. 172 Midway-Sunset, Kern Co.	34-12-24	890	sd. sh. drlg.
South Cerritos Oil Co., No. 4 Midway-Sunset, Kern Co.	22-32-23	1,691	sd. sh. drlg.
Standard Oil Co., No. 28-3-D Midway-Sunset, Kern Co.	3-32-24	3,890	sd. sh. drlg.
Gibson Oil Co., No. 4 O'Brian, Midway-Sunset, Kern Co.	6-11-23	820	sd. sh. drlg.
Goldman, Frank, No. 4 Midway-Sunset, Kern Co.	22-32-23	2,050	pump. 105 b.d.
McGray, Robert, No. 1 Midway-Sunset, Kern Co.	22-32-23	1,502	sd. sh. drlg.
McGray, Robert, No. 2 Midway-Sunset, Kern Co.	22-32-23	1,687	sd. sh. drlg.
Five Points Oil Co., No. 2-3 Midway-Sunset, Kern Co.	18-11-23	1,053	cleaning out
Dunlap, D. D., No. 1 Midway-Sunset, Kern Co.	15-32-23	2,778	pump. 51 b.d
Texas Co., No. 17 Midway-Sunset, Kern Co.	32-32-24	3,101	cleaning out
Union Oil Co., No. 3 Williams, Midway-Sunset, Kern	22-32-23	1,850	pump. 490 b.d.
Union Oil Co., No. 4 Keene, Midway-Sunset, Kern Co.	22-32-23	1,800	sd. sh. drlg.
Birch-Ranch Oil Co., No. 1 Midway-Sunset, Kern Co.	22-32-23	2,099	pump. 95 b.d.
Oil, Incorporated, No. 1 Midway-Sunset, Kern Co. ..	7-11-23	1,483	sd. sh. drlg.
Oil Producers, Inc., No. 1 Midway-Sunset, Kern Co. ...	7-11-23	981	sd. sh. drlg.
St. Helens Pet. Co., No. 1 Midway-Sunset, Kern Co. ..	22-32-24	3,730	P.B. 3,645
Reserve Oil & Gas Co., No. 33-1 Tejon, Kern Co.	33-11-19	4,989	looks wet
Reserve Oil & Gas Co., No. 33-2 Tejon, Kern Co.	33-11-19	4,495	idle
Reserve Oil & Gas Co., No. 33-3 Tejon, Kern Co.	33-11-19	1,950	sd. sh. drlg.
Hall-Baker Co., No. 1-10 Tejon, Kern Co.	12-11-19	2,639	P.B. 1,800
Ohio Oil Co., No. 2 Tejon, Kern Co.	21-11-19	5,930	sd. sh. drlg.
Buffalo Oil Co., No. 1 Tejon, Kern Co.	5-10-19	697	sd. sh. drlg.
Western Gulf, No. 3 Cantua, Fresno Co.	3-17-15	8,527	redrlg. 7,890
K. N. D. A., No. 4-18-J Kettleman North, Fresno Co.	18-21-17	9,190	hd. sd. drlg.
K. N. D. A., No. 25-20-J Kettleman North, Fresno Co.	20-21-17	7,891	hd. sd. drlg.
K. N. D. A., No. 21-30-J Kettleman North, Fresno Co.	30-21-17	8,849	salt water
K. N. D. A., No. 52-30-J Kettleman North, Fresno Co.	30-21-17	8,480	hd. sd. drlg.
K. N. D. A., No. 63-28-J Kettleman North, Fresno Co.	28-21-17	8,480	fish. D.P.
K. N. D. A., No. 83-24-H Kettleman North, Fresno Co.	24-21-16	8,882	perforating
K. N. D. A., No. 81-32-J Kettleman North, Fresno Co.	32-21-17	7,283	sd. sh. drlg.
K. N. D. A., No. 85-32-J Kettleman North, Fresno Co.	32-21-17	7,651	hd. sd. drlg.
K. N. D. A., No. 52-34-J Kettleman North, Fresno Co.	34-21-17	7,919	cmtd. 7,214
K. N. D. A., No. 72-34-J Kettleman North, Fresno Co.	34-21-17	8,150	cleaning out
K. N. D. A., No. 47-2-P Kettleman North, Kings Co.	2-22-17	7,120	cmtd. 7,119
Standard Oil Co., No. 32-19-J Kettleman North, Fresno	19-21-17	8,836	cleaning out
Standard Oil Co., No. 8-19-J Kettleman North, Fresno	19-21-17	5,997	sd. sh. drlg.
Standard Oil Co., No. 72-19-J Kettleman North, Fresno	19-21-17	8,820	looks wet
Standard Oil Co., No. 85-19-J Kettleman North, Fresno	19-21-17	7,890	sd. sh. drlg.
Standard Oil Co., No. 46-13-H Kettleman North, Fresno	13-21-16	9,165	hd. sd. drlg.
Standard Oil Co., No. 54-1-U Kettleman North, Kings	1-23-18	9,675	P.B. 8,260
Standard Oil Co., No. 48-35-J Kettleman North, Kings	35-21-17	8,018	P.B. 7,153
Standard Oil Co., No. 46-19-V Kettleman Middle, Kings	19-23-19	7,778	test. W.S.O.
Associated Oil Co., No. 2 Avenal, Kings Co.	35-23-17	490	sd. sh. drlg.
McBurney Oil Co., No. 1 Carriso, San Luis Obispo Co.	23-32-22	2,150	bailing O.&W.
Foster, R. A., No. 1 Carriso, San Luis Obispo Co. ...	2-32-22	5,000	cleaning out

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Bldg., building.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
Br. sh., brown shale.
B.S., basic sediment.
C.P., casing pressure.
Cd or Crd., cored.
C.D., corrected depth.
Cg., coring.
C.L., center line.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg. or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
L.D.D., later drilled deeper.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging or plugged back.
P.B.P., pulling big pipe.
P.L., pipe line.
P.L.O., pipe line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.R.T., rigging up rotary tools.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sd. sh., sandy shale.
Sdtr., or St., sidetracking.
S.D.P.L., shut down for pipe line.
S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporary abandoned.
Tbg., tubing.
T.D., total depth.
T.P., tubing pressure.
Tr., tract.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting on cement to set.
W.P., working pressure.
W.S.O., water shutoff.
W.S.O.O.K., water shutoff O.K.
W.S.O.N.G., water shutoff no good.
W.S.R. or W.O.S.R., wait on standard rig.
Wtr., water.

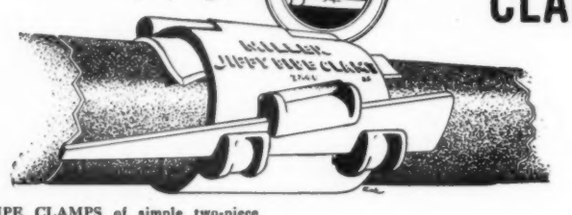
Jerkins Trust, No. 1 Indian Knob, San Luis Obispo Co.	26-31-12	1,473	cleaning out
Calif. Producing Co., No. 1 Pattiway, San Luis Obispo	19-10-24	751	sd. sh. drlg.
Union Oil Co., No. 1 Huasna, San Luis Obispo Co. ...	22-32-15	3,910	br. sh. drlg.
Lewis, A. O., No. 1 Pecho, San Luis Obispo Co.	34-30-10	2,310	will deepen
Martin, J. D., No. 4 Pismo, San Luis Obispo Co. ...	5-32-13	3,262	idle
Martin, J. D., No. 5 Pismo, San Luis Obispo Co. ...	5-32-13	3,250	idle
Aviation Oil Co., No. 1 Pismo, San Luis Obispo Co. ..	15-11-35	1,065	sd. sh. drlg.
Cholame Synd., No. 1 Cholame, San Luis Obispo Co. ..	10-25-15	3,687	cleaning out
Texas Co., No. 1 King City, Monterey Co.	30-19-7	531	sd. sh. drlg.
Shell Oil Co., No. 1 Pleyto, Monterey Co.	34-24-10	8,994	P.B. 8,750
Shell Oil Co., No. 2 Pleyto, Monterey Co.	34-24-10	5,125	fish. D.P.
Texas Co., No. 2 Eureka, Humboldt Co.	22- 3-1	7,100	sd. sh. drlg.
Amerada Pet. Co., No. 3 Rio Vista, Solano Co.	26- 4-2	6,791	P.B. 4,290
Associated Oil Co., No. 1 Sargent, San Benito Co. ...	5-12-4	4,786	redrlg. 4,197
Standard Oil Co., No. 4 McDonald Island, San Joaquin	19- 2-5	5,712	dry; abd.
Buttes Oilfields, Ltd., No. 1 Kent, Sutter Co.	2-15-1	3,165	gr. sd. drlg.
Jennings, E. P., No. 1 Allensworth, Tulare Co.	4-24-23	2,501	bl. sh. drlg.

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Standard Oil Co., No. 1 Alondra, Los Angeles Co. ...	22- 3-14	7,900	hd. sh. drlg.
Ohio Oil Co., No. 2 El Segundo, Los Angeles Co. ...	7- 3-14	2,541	sd. sh. drlg.
Signal Finance, No. 1 Hawthorne, Los Angeles Co. ...	10- 3-14	9,395	cleaning out
Listle, J. L., No. 1 Moneta, Los Angeles Co.	33- 3-14	7,352	dry; abd.
C. C. M. Oil Co., No. 2 Torrance, Los Angeles Co. ...	31- 3-14	3,154	pump. 50 b.d.
Black Gold Corp., No. 2 Torrance, Los Angeles Co. ...	6- 4-14	3,710	pump. 55 b.d.
Nelson Pet. Co., No. 2 Torrance, Los Angeles Co. ...	18- 4-14	3,357	O.S. drlg.
Keystone Consd. Oil Co., No. 1 Redondo, Los Angeles	8- 4-14	3,100	cmtd. 3,100
Standard Oil Co., No. 81 Inglewood, Los Angeles Co.	8- 2-14	3,550	flow. 1,107 b.d.
Universal Consd., No. 1 Gardena, Los Angeles Co. ...	36- 3-14	6,398	sd. sh. drlg.
Shell Oil Co., No. 86 Reyes, Dominguez, Los Angeles	33- 3-13	4,699	flow. 170 b.d.
Shell Oil Co., No. 87 Reyes, Dominguez, Los Angeles	33- 3-13	7,413	sd. sh. drlg.
Shell Oil Co., No. 88 Reyes, Dominguez, Los Angeles	33- 3-13	3,992	sd. sh. drlg.
Union Oil, No. 42 Callender, Dominguez, Los Angeles	33- 3-13	7,567	sd. sh. drlg.
Union Oil, No. 48 Callender, Dominguez, Los Angeles	33- 3-13	5,320	sd. sh. drlg.
Union Oil, No. 50 Callender, Dominguez, Los Angeles	33- 3-13	8,447	cleaning out
Union Oil, No. 42 Hellman, Dominguez, Los Angeles	33- 3-13	7,520	sd. sh. drlg.
Barnsdall Oil Co., No. 10 Rosecrans, Los Angeles Co.	20- 3-13	6,130	O.S. drlg.
Shell Oil Co., No. 1 Rosecrans, Los Angeles Co.	20- 3-13	4,190	sd. sh. drlg.
Calizoo Oil Co., No. 1 Compton, Los Angeles Co.	16- 3-13	3,985	fish. D.P.
Eastern Oil Co., No. 1 Playa Del Rey, Los Angeles Co.	22- 2-15	7,562	pump. M.&W.
Sharby Oil Co., No. 1 Playa Del Rey, Los Angeles Co.	22- 2-15	7,400	fish. D.P.
Union Oil Co., No. 15 D.R., Playa Del Rey, Los Angeles	27- 2-15	5,894	sd. sh. drlg.
Superior Oil Co., No. 1 Del Rey, Los Angeles Co. ...	25- 2-15	9,491	sd. sh. drlg.
Barnsdall Oil Co., No. 1 Newhall, Los Angeles Co. ...	26- 4-17	6,154	sd. sh. drlg.
Twin Harbor Oil Co., No. 1 Wilmington, Los Angeles	27- 4-13	1,281	sd. sh. drlg.
Sunset Oil Co., No. 1 Wilmington, Los Angeles Co. ..	28- 4-13	3,640	cleaning out
Sunset Oil Co., No. 3 Wilmington, Los Angeles Co. ..	28- 4-13	2,431	sd. sh. drlg.
Selegna Oil Co., No. 1 Wilmington, Los Angeles Co.	28- 4-13	3,685	bailing
General Pet. Corp., No. 2 Wilmington, Los Angeles Co.	5- 5-13	3,651	sd. sh. drlg.
Royalty Service Corp., No. 1 Wilmington, Los Angeles	5- 5-13	1,160	sd. sh. drlg.
Richfield Oil Co., No. 2 Nutt, Montebello, Los Angeles	5- 2-11	5,265	sd. sh. drlg.
Richfield Oil Co., No. 1 Estrada, Montebello, L. Angeles	5- 2-11	2,130	sd. sh. drlg.
Honolulu Oil Corp., No. 1 Montebello, Los Angeles Co.	14- 2-12	974	sd. sh. drlg.
Hathaway, No. 2 Fulton, Santa Fe Springs, Los Angeles	6- 3-11	4,650	cleaning out
Union Oil Co., No. 100 Santa Fe Springs, Los Angeles	6- 3-11	7,638	sd. sh. drlg.
Sibert Oil Co., No. 1 Santa Fe Springs, Los Angeles	31- 2-4	4,802	redrlg. 4,450
Julian & Criswell, No. 1 Walnut, Los Angeles Co. ...	5- 2-9	1,350	sd. sh. drlg.
Cayton, N. H., No. 1 Whittier, Los Angeles Co.	22- 2-11	1,897	sd. sh. drlg.
W. C. W. Oil Co., No. 2 Huntington, Orange Co.	34- 5-11	4,327	looks wet
Kohlbush, H. S., No. 1 Huntington, Orange Co.	34- 5-11	4,890	looks wet
Dunlap, D. D., No. 4 Huntington, Orange Co.	2- 6-11	3,888	cleaning out
Dunlap Trust, No. 1 Huntington, Orange Co.	2- 6-11	2,498	sd. sh. drlg.
Terry, George, No. 2 Crane, Huntington, Orange Co.	2- 6-11	2,000	cleaning out
Petroleum Co., No. 4 Huntington, Orange Co.	2- 6-11	3,944	reaming
Car-Fad Oil Co., No. 2 Huntington, Orange Co.	2- 6-11	2,950	sd. sh. drlg.
Hammil Oil Co., No. 2 Huntington, Orange Co.	34- 5-11	5,155	O.S. drlg.
Speik Oil Co., No. 5 Huntington, Orange Co.	2- 6-11	1,450	sd. sh. drlg.
South Basin Oil Co., No. 94 Huntington, Orange Co. ..	2- 6-11	3,380	redrlg. 2,897
Elliott Oil Co., No. 1 Huntington, Orange Co.	34- 5-11	4,066	test. wet
Lucky Strike Oil Co., No. 7 Huntington, Orange Co. ..	2- 6-11	3,352	redrlg. 2,572
Pan-Coast Oil Co., No. 1 Huntington, Orange Co. ...	34- 5-11	2,864	sd. sh. drlg.
Richfield Oil Co., No. 10 Fidelity, Huntington, Orange	34- 5-11	3,974	redrlg. 2,085
Richfield Oil Co., No. 1 Community, Huntington, Orange	34- 5-11	3,125	rebldg. rig
Richfield Oil Co., No. 1 Crowell, Huntington, Orange	34- 5-11	4,650	resume work
Commander Oil Co., No. 1 Newport, Orange Co.	29- 6-10	3,820	br. sh. drlg.
Standard Oil Co., No. 2-5 East Coyote, Orange Co.	22- 3-10	4,576	sd. sh. drlg.
Oil Conservation Co., No. 1 East Coyote, Orange Co.	17- 3-9	2,814	bailing
Wilbur, V. R. G., No. 1 East Coyote, Orange Co.	20- 3-9	2,099	sd. sh. drlg.
Graham & Loftus, No. 1 East Coyote, Orange Co.	18- 3-9	3,134	O.S. drlg.
Associated Oil Co., No. 52 East Coyote, Orange Co. ..	18- 3-9	3,487	resume work
Bartholomae Oil Co., No. 3 East Coyote, Orange Co.	22- 3-10	3,410	sd. sh. drlg.
West Coast Ref. Co., No. 1 Santa Ana, Orange Co.	25- 3-9	2,763	P.B. 2,200
Bachman Pet. Co., No. 1 Richfield, Orange Co.	29- 3-9	1,871	sd. sh. drlg.
Union Oil Co., No. 29 Chapman, Richfield, Orange Co.	30- 3-9	8,610	fish. D.P.
Union Oil Co., No. 38 Chapman, Richfield, Orange Co.	29- 3-9	3,546	pump. 150 b.d.
Union Oil Co., No. 39 Chapman, Richfield, Orange Co.	29- 3-9	3,330	sd. sh. drlg.
Union Oil Co., No. 40 Chapman, Richfield, Orange Co.	29- 3-9	2,460	sd. sh. drlg.
Union Oil Co., No. 42 Chapman, Richfield, Orange Co.	29- 3-9	1,492	sd. sh. drlg.
Standard Oil Co., No. 2-11 Kraemer, Richfield, Orange	30- 3-9	4,268	sd. sh. drlg.
Standard Oil Co., No. 2-24 Kraemer, Richfield, Orange	32- 3-9	3,520	sd. sh. drlg.
Calif. Eastern Oil Co., No. 1 Placentia, Orange Co. ...	31- 3-9	4,936	dry; abd.
Equitable Pet. Co., No. 1 Wildcat, San Bernardino Co.	11-10-5	2,812	hd. sd. drlg.

REPAIR THAT LEAKING LINE AT SMALL COST

MILLER *Jiffy* PIPE CLAMP



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KEEP ASSORTED SIZES ON HAND FOR EMERGENCIES.

Size of pipe	2-inch		3-inch	4-inch
Length of clamp	4-in.	8-in.	6-inch	6-inch
Price each	$1.00	$1.75	$2.00	$2.40

Order through your supply store or direct—we pay shipping charges on orders of one dozen or more clamps.

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OKLAHOMA CITY, OKLAHOMA

Branch Shops and Offices Sapulpa, Oklahoma, and Kilgore, Texas.

KANSAS

Week Ending December 26 (Descriptions are East unless marked otherwise)

Barber County

Pure Oil Co. No. 1 Palmer, SE NE SW sec. 10-33-10w. K.C. 3,818 ft.; chat 4,505 ft.; Big L. 4,558 ft.; Hunton 4,655 ft.; Viola 4,719 ft.; cg. 4,726 ft.

Sinclair Prairie Oil Co. No. 1 Gentry, NE cor. sec. 1-33-15w. Miss. 4,807 ft. (cor.); Viola 5,105 ft.; Simpson 5,235 ft.; Wilcox 5,252 ft.; Sil. 5,331 ft.; T.D. 5,529 ft.; P.B. to 4,792 ft.; perf. csg. and shot; D.&A.

Barton County

Armer & Vernon O. & G. Co. No. 1 Ainsworth, NE NE SE sec. 33-16-13w. Anhy. 865 ft.; K.C. 3,154 ft.; Sil. 3,393-95 ft.; cmt. 5-in. csg. 3,385 ft.; T.D. 3,395½ ft.; pot. 1,241 B.O. in 24 hrs.; comp.

D. R. Buchanan et al No. 1 J. Schartz, Sr., NW NW NE sec. 20-19-11w. Set 10-in. at 518 ft.; W.O.C.

John Burton No. 1 Wendel, NE cor. sec. 13-19-11w. Anhy. 785 ft.; drlg. 2,810 ft.

Duwe & Brouk No. 1 Baker, NE SE SW sec. 16-17-13w. Drlg. 2,000 ft.

Freehorn et al No. 1 Sooy, NW NW NE sec. 27-18-12w. S.D. 200 ft.

Indian Terr. Illm. Oil Co. No. 1 Schrapel, SE SE NE sec. 26-20-11w. Drlg. 595 ft.

Minnehoma Oil & Gas Co. No. 1 Smith, NW NW NE sec. 20-18-13w. K.C. 3,097-3,112 ft.; R.U.S.T.

S. L. Parks No. 1 Peach, SE cor. sec. 24-16-14w. R.U.S.T.

C. L. Price No. 1 Deutsch, NW NW NE sec. 16-16-13w. Topeka 2,820 ft.; Oswald 3,135 ft.; Sil. 3,386 ft. (cor.); acidized: pot. 939 B.O. and S.W.; comp.

Butler County

Cox & McGinnis No. 1 Faulders, SW SW NE sec. 27-25-3e. M.I.M.

Ralph Wixson et al No. 1 Coulter, NW SW NE sec. 3-27-7. Drlg. 2,225 ft.

Chase County

Propp et al No. 1 Fromm, SE cor. sec. 29-18-9e. Fsg. 2,440 ft.

Cowley County

Austin & McKnabb No. 1 Wilson, NE NE SE sec. 20-32-6. Drlg. 2,400 ft.

C. H. Cross No. 1 Cook, SW cor. sec. 6-32-6. 8-in. csg. 1,750 ft.; U.R. at 1,904 ft.

Home Natural Co. & McNish No. 2 Werner, SE SE SW sec. 31-32-6. Chat 3,068-87 ft.; S.O. 3,130-32 ft. and 3,140-42 ft. T.D. 3,190 ft.; P.B. to 1,900 ft.; set 8-in. csg. 1,984 ft.; 30 shots 1,865-80 ft.; 2,500,000 ft. gas; comp.

Tom Palmer No. 1 Pierce, SE SE SW sec. 14-31-3e. Stalnaker 2,110 ft.; K.C. 2,458 ft.; L. 3,035 ft.; drlg. 3,323 ft.

Simpson Oil Co. and Stanolind O. & G. Co. No. 1 Weigle, SW SW NE sec. 18-31-6. Drlg. 1,230 ft.

Earl Wakefield et al No. 1 Knapp, SW SW NW sec. 2-34-5e. R.U.

Decatur County

Winkler & Koch No. 1 Vessey, C NW SE sec. 26-3-26w. P.B. 1,023 ft.; drlg. 1,490 ft.

Edwards County

Stanolind O. & G. Co. et al No. 1 Donovan, C SE SE sec. 14-26-18w. Viola 4,642 ft.; S.S.O. 4,643-45 ft.; H.F.W. 4,840 ft.; drlg. 4,846 ft.

Ellis County

H. Jones Bros. et al No. 1 Phillips, SE SE NW sec. 9-15-17w. Anhy. 1,101 ft. set 8-in. 2,754 ft.; drlg. 2,875 ft.

Ted Kors et al No. 1 Koblitz, SE SW NW sec. 23-12-18w. Pay 3,694-98 ft.; swb. 73 B.O. in 6 hrs. and swbd. down; swbd. 6 B.O. in 1 hr.

Lario O. & G. Co. et al No. 1 Creas, NE cor. sec. 13-11-17w. Anhy. 965 ft.; set 8-in. csg. 2,524 ft.; drlg. 2,775 ft.

Loomis & Etyner No. 1 O'Laughlin, SE SE NW sec. 27-13-18w. Rotary rig.

Murphy Oil Co. No. 1 Wiesner, SE SE SW sec. 12-14-19w. Fsg. 1,275 ft.

Taylor et al No. 1 Emery, NE NE NE sec. 23-14-18w. Anhy. 1,162 ft.; K.C. 3,285 ft.; Sil. 3,558 ft.; 4 bbls. oil per hr. 3,566-68 ft.; T.D. 3,570 ft.; P.B. to 3,566 ft.; S.L.M.; perf. csg. 3,552-64 ft.; cmt. 6-in. 3,291 ft.; S.D.O.

Ellsworth County

Empire O. & R. Co. No. 1 Brown, SE SE NW sec. 1-17-9w. Drlg. 2,605 ft.

Grant County

Columbian Fuel Co. No. 1 Gray, C SE sec. 3-29-35w. T.D. 2,808 ft.; skidded rig.

Greenwood County

Hollis et al No. 1 Boone, NW NE NE SW sec. 21-26-12. Set 10-in. csg. to 490 ft.

Guy Scott et al No. 1 Pedroja, SE NE SE sec. 6-26-10. Miss. 2,122 ft.; pay 2,154-61 ft.; acid. 1,000 gal.; prod. 250 B.O. in 36 hrs.

Ohio Oil Co. No. 1 Schwab, SE SW SE sec. 9-24-10. R.U. machine.

Harvey County

Harburney Oil Co. No. 1 Schrag, NW NW SE sec. 24-22-3w. Chat 3,160 ft.; S.D. 3,350 ft.

Inca Prod. Co. No. 1 Moore, C NE NE sec. 25-24-3w. T.D. 3,091 ft.; D.&A.

Saco et al No. 1 Guthrie, NE NE NW sec. 8-22-2e. Lansing 2,187 ft.; 8-in. 2,765 ft.; C.O.

Haskell County

Helmerich & Payne No. 1 Meredith, C SW sec. 10-30-33w. R.U.R.

Kearney County

J. L. Murphy No. 1 Campbell, NW NW SW sec. 32-25-35w. Anhy. 1,900 ft.; T.D. 2,595 ft.; 1,400,000 ft. gas.

Kingman County

Shell Pet. Corp. No. 1 McMichael, C W½ W½ SW sec. 12-27-10w. Cellar.

Logan County

Rose Spring Drlg. Co. et al No. 1 Wright, C SE SE sec. 12-15-35w. Anhy. 2,330 ft.; Ft. Riley 2,868 ft.; fsg. 3,909 ft.

Lyon County

Clyde Fred et al No. 1 Bruce, NW cor. sec. 18-18-10. Set 10-in. csg. 1,200 ft.; drlg. 1,575 ft.

Marion County

Western Kansas Oil & Ref. Co. et al No. 1 Hauser, SW cor. sec. 19-19-4. Viola 2,610-44 ft.; D.&A.

Meade County

Pacific Midwest Co. No. 1 Rexford, NE SE SW sec. 8-30-29w. R.U.

Mitchell County

Geo. Siedhoff et al No. 1 Greiss, SW SW SE sec. 16-8-10w. Drlg. 1,903 ft.

Ness County

Newton Dev. Co. No. 1 Tenny, NW NW SE sec. 19-18-25w. 10-in. 1,942 ft.; S.D. 2,717 ft.

Osborne County

Helmerich & Payne No. 1 Hittinger, C SE SE sec. 2-7s-11w. Loc.

Pawnee County

Kessler & Thier et al No. 1 Wallace, SE SE NW sec. 16-23-15w. Drlg. 400 ft.

Pratt County

H. V. Elwell et al No. 1 Fay, NW NW SE sec. 15-27-14w. Fsg. 3,500 ft.

Reno County

Carlock et al No. 1 Brown Realty Co., NW NW NE sec. 32-22-10w. Rig.

Empire O. & R. Co. No. 1 Schrock, NW NW SE sec. 22-24-5w. Drlg. 3,367 ft.

Foraker et al No. 1 Hiett, SE SW NE sec. 34-24-4w. S.D. 3,800 ft.

Helmerich & Payne No. 1 Stewart, SE SE NE sec. 16-24-6w. Rig.

Clyde Pulse No. 1 Payne, SW NW NE sec. 4-22-7w. S.D. 1,955 ft.

Torry & Feaster No. 1 Schroeder, SE cor. sec. 1-23-7w. B.R.

Westgate-Greenland Oil Co. No. 1 Fossey, SW SW SE sec. 12-22-8w. Chat 3,566-75 ft.; drlg. 3,755 ft.

W. E. Witt et al No. 1 Wright, SE NE NE sec. 9-23-8w. B.R.R.

Rice County

Aylward et al No. 1 M. A. Johnson, NW NW NE sec. 17-21-7w. Cong. 3,358-60 ft.; T.D. 3,390 ft.; flwd. 710 B.O. in 6 hrs.; pot. 2,818 B.O.; comp.

Carlock et al No. 1 Deweese, SW NW NW sec. 32-20-7w. K.C. 2,895 ft.; Cong. 3,315 ft.; 300 ft. O.I.H. in 12 hrs. at 3,333 ft.; Chat 3,355-57½ ft.; drlg. 3,377 ft.

Charles Pet. Corp. No. 1 Speck, NW NW SE sec. 29-20-8w. Sil. 3,650-72 ft.; D.&A.

Dickey Oil Co. No. 1 Brothers, SE cor. sec. 1-21-7w. Drlg. 1,465 ft.

Hanna et al No. 1 Brothers, SE SE NW sec. 25-20-8w. Rig.

Indian Terr. Ill. Oil Co. No. 1 Fossey, SW SW SW NE sec. 31-20-10w. 10-in. 1,963 ft.; 12-in. 1,315 ft.; drlg. 2,015 ft.

Sage et al No. 1 Patton, SW cor. sec. 5-21-7w. Chat 3,365-66½ ft.; pot. 1,560 B.O.; comp.

Shell Pet. Corp. et al No. 1 Soeken "A," C NW sec. 10-19-9w. Sil. 3,300-09 ft., T.D.; cmt. 7-in. at 2,905 ft.; P.B. to 2,923 ft.; acd. 1,000 gal.; swb. 175 B.O. and 175 B.W. in 8 hrs.

Rooks County

Buckner & Schoff No. 1 McConnel, NE cor. sec. 34-6s-18w. Set 10-in. csg. 1,756 ft.; C.O. 1,765 ft.

Empire Oil & Ref. Co. No. 1 Ham, SW NW NW sec. 24-8-19w. Anhy. 1,389 ft.; K.C. and 8-in. csg. 3,180 ft.; Cong. 3,456 ft.; Sil. 3,522 ft.; drlg. 3,570 ft.

Graham et al No. 1 Fike, SW cor. sec. 9-9-17w. Topeka 2,933 ft.; K.C. 3,187 ft.; 7-in. csg. 3,205 ft.; R.U.S.T. 3,220 ft.

J. H. Lester No. 1 Methene, SE SE NE sec. 29-10-20w. S.D. 3,422 ft.

J. A. Shoemake No. 1 Stebbins, NE NE SW sec. 26-7-17w. T.D. 3,591 ft.; P.B. to 2,806 ft.; pmpd. 25 B.O. and 100 B.W.

Snowden & McSweeney No. 1 Hindman, C E½ NW sec. 35-17s-17w. Howard 2,772 ft. (cor.); S.S.O. 2,777-80 ft.; W.O.C.

Rush County

G. M. Piggott et al No. 1 Maresch, C NW NW sec. 28-19-19w. 15-in. at 65 ft.; W.O.C. at 170 ft.

Schoenfeld & Kitch No. 1 Winget, SE cor.

sec. 15-16-16w. Topeka 2.891 ft.; S.O. 3,068 ft.; drlg. 3,104 ft.

Russell County

El Dorado Refining Co. No. 1 Scott, NW NW NE sec. 17-13-13w. Drlg. 1,705 ft.

Empire O. & R. Co. No. 1 Frederick, SE cor. sec. 18-15-11w. Drlg. 2,640 ft.

Equity Gas Co. No. 1 Harbaugh, NW NE SW sec. 19-13-12w. Set 10-in. csg. 780 ft. W.O.C.

Thayer Drlg. Co. and Dee Miller, SW cor. sec. 10-13-15w. Drlg. 620 ft.

Saline County

Brouk et al No. 1 Othelander, NE NW SE sec. 10-16-3w. Viola 3,294 to 3,440 ft. Wilcox 3,493 ft.; H.F.W. 3,505 ft.; Sil. 3,520-25 ft., T.D.; P.B. to 3,440 ft.; set 5-in. 3,388 ft.

Ryan Consd. No. 1 Wuerth, SW SW NW sec. 28-14-2w. R.U.M.

Sedgwick County

Cameron et al No. 1 Smith, SW SE SE sec. 13-27-2e. Spudded and S.D.

Scott County

C. R. Blackman et al No. 1 Nolan, NW NW NE sec. 13-19-33w. Loc.

Sheridan County

O. A. Roberts et al No. 1 Corrick, C NW sec. 34-9-26w. Drlg. 3,030 ft.

Stafford County

Empire Ref. Co. et al No. 1 Jordon, SW SW NW sec. 15-25-14w. K.C. 3,640 ft.; pay 3,722-27 ft.; acd. 2,000 gal.; Pot. 575 B.O., 2% wtr.; to D.D.

C. H. Lebow et al No. 1 Wolk, SE SW NW sec. 3-21-12w. Drlg. 2,563 ft.

Skelly Oil Co. et al No. 1 Kipp, SE SE NE sec. 27-25-14w. Simpson 4,205 ft.; Sil. 4,239 ft.; H.F.W. 4,248-50 ft., T.D.; P.B. to 3,914 ft.; set 7-in. 3,825 ft.; W. O.C.

C. E. Skiles et al No. 1 Hughes, SW cor. sec. 12-23-12w. Drlg. 2,390 ft.

E. Skiles No. 1 Leidigh, NW NW SW sec. 21-22-11w. H.F.W. 3,650-53 ft.; D. &A.

Stanolind O. & G. Co. No. 1 Rosacker, SW SW NE sec. 5-25-11w. 13-in. 229 ft.; W. O.C. 230 ft.

Sumner County

Empire O. & R. Co. No. 1 Hoffman, NW NW SW sec. 27-34-1e. S.S.O. 3,440-53 ft.; L. 3,705 ft.; 6-in. 3,706 ft.; C.O. 3,708 ft.

Graham et al No. 1 Dawson, NW NW NW sec. 4-33-2w. K.C. 3,238 ft.; whipstock 2,750 ft.; drlg. by.

Hapenny & Green et al No. 1 Evers, SE SE NE sec. 27-31-2. S.D. 519 ft.

Lario O. & G. Co. et al No. 1 Hall, NW SW NW sec. 11-35-1e. Drlg. 2,310 ft.

Orcott & Stewart No. 1 Newton, SE cor. sec. 21-30-2. O.W.W.D.; drlg. 840 ft.

Rose Spring Drlg. Co. et al No. 1-A Rutter, C NW NW sec. 21-33-2e. Pay 3,225-29 ft., T.D.; flows 75 bbls. oil every 12 hrs.

Lloyd, Study & Frost et al No. 1 fee, SE cor. sec. 31-34-1e. Drlg. 2,650 ft.

Trego County

Black Gold Oil Co. No. 1 Allman, C SW SW sec. 34-14-21w. Rot. rig.

York State Oil Corp. No. 1 Gugler, SW cor. sec. 36-12-21w. Sil. 3,830 ft.; pay 3,837-39 ft.; P.B. to 3,832 ft.; swb. 3 B. F.P.H., ⅔ oil, for 12 hrs.; P.B. to 3,838 ft.; P. 11 B.O. in 24 hrs. S.D.O.

Woodson County

Ross & Marshall No. 1 Bresner, SW SW SE sec. 6-26-15. R.U.

Reamer No. 1 Corn, NE cor. sec. 31-26-15 Miss L. 1,469 ft. (cor.); 6-in. csg. 1,471 ft.; S.D. 1,680 ft.

OKLAHOMA

Week Ending December 26

NORTHERN OKLAHOMA

Beckham County

Mid-American Oil Co. No. 1 Biscoe, SW SW SW sec. 28-8-22w. S.D. 1,100 ft.

Choctaw County

Cooper & Branstetter No. 1 Bell, C NW NE sec. 29-6s-17. M.I.M.

Cleveland County

Helmerich & Payne, Inc. No. 1 Glenn, C NW NE sec. 6-8-1w. Layton 4,835 ft.; drlg. 5,968 ft.

W. R. Hollenbeck No. 1 Norman, NW NW NE sec. 17-9-2w. Rig.

Coal County

Carter Oil Co. et al No. 1 Warne, NE NE NW sec. 31-3-9. Sdy. L. 5,550-56 ft.; S. S.O.; cd. 5,556-60 ft.; no recovery.

Continental Oil Co. No. 1 Breedlove, NW SW SW sec. 24-1-8. Syl. 5,105 ft.; Viola 5,249 ft.; drlg. 5,519 ft.

Continental Oil Co. No. 1 Daniels, SW NE SW sec. 27-1-9. Mayes 5,835 ft.; Woodford 5,860 ft.; Hunton 6,044 ft. S.S.O.; cd. to 6,066 ft.

Continental Oil Co. No. 1 King, NE SW NE sec. 26-1-8. Wilcox 5,743 ft.; T.D. 5,762½ ft.; P.B. 1,300 ft.

Continental Oil Co. No. 1 W. Kirby, SW SE SW sec. 23-1n-8e. Drlg. 2,135 ft.; flwd. 8 B.O.; C.O.

Shell Pet. Corp. No. 4 Hill-A, NW sec. 30-3-10. Sd. 5,768 ft.; S.S.O. 5,780-95 ft.; T.D. 5,902 ft.; D.&A.

Creek County

M. W. Mosier et al No. 1 Holcomb, SE SW NW sec. 19-18-8. Layton 1,605-95 ft.; Jones 1,835-50 ft.; Cleveland 1,985-2,010 ft.; S.G.; Prue 2,505-50 ft.; sd. 2,559-60 ft.; S.O.; 6-in. at 2,545 ft.

W. J. Sherry No. 1 Childers, SW SW NE sec. 2-15-7. Loc.

Garfield County

Arab Oil Co. No. 1 Harkendorf, NE cor. sec. 34-20-3w. Digging pits.

Ohio Oil Co. No. 1 McFarland, SE SE SE sec. 25-24-3w. First Wilcox 4,940-5,002 ft.; second Wilcox 5,008-60 ft.; Tyner 5,060 ft.; T.D. 5,242 ft.; twisted off pipe froze; trying to jar loose.

Garvin County

Ellison & Hammond No. 1 Selby, C SE NW sec. 24-2n-3w. Drlg. 5,925 ft.

Hayes Drlg. Co. No. 1 Howell, NW SE NW sec. 34-1-1. Rig.

Greer County

Bud Lewis et al No. 1 Webster, SW NE NE NE sec. 7-7-24w. T.D. 1,745 ft.; fsg.

Neff-Godfrey-Andrea No. 1 Melton, SE NW SE sec. 16-3n-22w. Loc.

Hughes County

W. W. Bussett No. 1 Field, C NW SW sec. 11-9-11. S.D.

Carson Oil Co. No. 1 Lyter, NE NW SW sec. 31-8-12. Loc.

R. K. Ellison No. 1 Peters, SE NW SE sec. 8-6-10. Wapanucka 3,918 ft.; drlg. 3,956 ft.

McAdams & Barnes No. 1 Koch, SW NE NE sec. 1-9-10. T.D. 3,838 ft.; S.D. for csg.

Mid-Western Prod. Co. No. 1 Hill C SE NW sec. 13-9-9. Calvin 1,440 ft.; T.D. 1,564 ft.; S.D.

Southern Oil Co. No. 1 Buck, C NW SW SW sec. 21-8-10. R.U.S.T.

Kay County

Black Gold No. 2 Cooley, SW SW SE sec. 25-28-4e. Abd. loc.

G. A. Brown et al No. 1-A Harris, SW SW NE sec. 14-25-1e. B.R.

Helmerich & Payne No. 1 Constant, SW SW NE sec. 17-28-2w. Drlg. 3,235 ft.

Kiowa County

Argus Pet. Co. No. 1 Osborne, NW cor. NE sec. 9-7-16w. L. 1,180 ft. S.D. 1,225 ft. T.D.

Burns & Moore No. 1 Block, NW NE SW sec. 31-6-16w. S.D. 50 ft.

Nagel & Adams No. 1 Oster, SW NE SW sec. 27-7-17w. T.D. 930 ft.; fsg.

Latimer County

Cheyenne Oil Co. No. 1 Wilson, C SE SE sec. 15-5-18. T.D. 2,902 ft.; cond. hole.

Le Flore County

McCraw et al No. 1 Tidwell, C NW SE sec. 17-3-22. 10-in. 2,246 ft.; T.D. 2,340 ft.; S.D.

Lincoln County

Fleetborn Oil Corp. No. 1 Turner, NW NW SE sec. 28-17-5. Layton 2,284 ft.; S.G.; B'ville 3,508 ft.; first Wilcox 3,953-67 ft.; est. 4,000,000 ft. gas, no oil, on D. S.T.; second Wilcox 3,985-86 ft.; tbg. at 3,996 ft.; sprayed 33 B.O. in 12 hrs.

Skelly Oil Co. No. 1 Laughlin, C SE NW sec. 29-17-3e. Pits.

Logan County

Anthony & Marshall No. 1 Fruin-Eckman, SE SE SW sec. 4-16-1e. C.O. 4,955 ft.

Harry Blackstock No. 1 Prince, SE NE SW sec. 11-17-3w. Digging cellar.

Helmerich & Payne et al No. 1 Hasler, NW NW SE sec. 14-16-4w. Miss. 5,945 ft.; drlg. 6,140 ft.

Muskogee County

A. D. Spears et al No. 1 Robbins, NW cor. sec. 20-15-20. Turkey Mt. sd. 1,677-84 ft.; Arbuckle 1,710 ft.; T.D. 1,811 ft.; S.S.O.; S.D.

Noble County

Bailliere & Lindsey et al No. 1 Aetna Life, SE SE NW sec. 1-23-2w. Oread, 2,460 ft.; drlg. 3,210 ft.

Shell Pet. Corp. No. 1 Moelling, C SW NW sec. 31-21-2w. T.D. 5,389 ft.; bailed down 1,250 ft. and flwd. into pits; est. 80 to 100 B.O.P.H.; 4,000,000 to 10,000,000 ft. gas; pot. 4,800 B.O.; comp.

Okfuskee County

Harvey Oil Co. No. 1 Stewart, NE cor. sec. 28-10-9. Set 10-in. csg. at 61 ft.; S.D.

Okla. Oil Corp. No. 1 Dawley, NW NW SE sec. 8-10-9. Senora 1,800-58 ft.; T.D. 1,886 ft.; 5 and 80-qt. shots.; S.D.

Osage County

Norbia Oil Co. No. 1 Osage, NE NE SW sec. 13-23-6. R.U.M.

Pawnee County

Forest Dev. Corp. No. 1 Otter, NE NW sec. 15-21-5. Bartlesville 3,173 ft.; Cd. 3,180-3,225 ft.; S.O.&G.; R.U.S.T.; Schlumberger test showed wtr.; S.D.

Payne County

H. F. Young No. 1 Jenkins, SE NW SE sec. 4-17-3e. Digging cellar.

Pittsburg County

Okla. Dist. Oil Co. No. 1 Beeler, NE NE SW sec. 7-7-14. Wapanucka 4,490 ft.; T.D. 4,525 ft.; fsg.

Pontotoc County

Caloma Oil Corp. No. 1 Brentz, SE NE SW sec. 4-1-6. S.D. 503 ft.

W. A. Delaney and Boettcher O. & G. Co. No. 2 Alexander, SW NE SW sec. 24-4-7. Old T.D. 3,520 ft.; drlg. 3,963 ft.

E. H. Moore et al No. 1 Muse, SW NE SE sec. 33-2n-7. Cellar and pits.

Ramsey Pet. Co. No. 1 Johnson, NW SW SE sec. 9-3-7. Hunton 1,519 ft.; S.O. Halliburton test showed mud and oil; Sylvan 1,919 ft.; Viola 2,050 ft.; cg.

Pottawatomie County

Mid-Continent Pet. Corp. No. 1 Logan, NE NE SE sec. 31-11-15. Set 13-in. 154 ft.; W.O.C.

Seminole County

Carter Oil Co. et al No. 1 Simpson, SW SW NE sec. 7-8-8. Bldg. rig.

H. E. Kennedy No. 1 Bowlegs, NW NW SE sec. 3-8-7. Calvin 1,989 ft.; drlg. 2,580 ft.

Okla. Oil Corp. No. 1-A Gaines, NE SW SW sec. 20-6-7. Cellar.

E. M. Purcell No. 1 Gilliland, SE SE SW sec. 24-11-7. Loc.

A. I. Spears No. 1 Keaton, NW cor. sec. 6-5-8. Rig.

Paul Traugh No. 1 Williams, NE SE NE sec. 22-6-6. Senora 2,347 ft.; T.D. 2,361 ft.; drlg. plug.

Texas County

Allison & Barnhill No. 1 Bingley, SE SE NE sec. 30-2n-18. (Cimmaron Meridian). S.S.G. 2,661 ft.; increases 2,698-2,710 ft. and 2,745-50 ft.; T.D.; est 2,000,000 ft. gas; S.D.

SOUTHERN OKLAHOMA

Atoka County

A. J. Sanders No. 3 Redden, SE SW SW sec. 19-1n-15e. Sdy. L. 910 ft.; cd. to 932½ ft.; bailed to 60 ft. off bottom; rainbow S.O.; tstg.

Carter County

Head & Straus No. 1 Simpson & Fell, NW NW SE sec. 5-1s-3w. T.D. 1,464 ft; rmg. hole at 760 ft.

Comanche County

Frank Scott No. 1-A Kuntz, SE NE SE sec. 21-4-11w. Drlg. 1,830 ft.

C. V. Morris No. 1 Young, SE NE SE sec. 24-3n-10w. Drlg. 660 ft.

L. D. Wise No. 1 Cones, SE SE SW sec. 11-1n-10w. T.D. 2,156 ft.; S.D.

Cotton County

Chas. F. Newson No. 1 Wilson, C SW NW sec. 17-4s-11w. L. 4,110 ft.; T.D. 4,218 ft.; D.&A.

Phillips Pet. Co. No. 1 Warren, C NE NE SE sec. 1-5s-13w. Sd. 3,328-37 ft.; T.D.; fsg.

Harmon County

Lloalko Trust, Ltd. No. 1 Crosnoe, SE SE SW sec. 14-3n-25w. T.D. 2,980 ft.; S. D.O.

Jackson County

Everett & Morgan No. 1 Dameron, NW SW SW sec. 34-3n-18w. T.D. 301 ft.; S.D.O.

Jefferson County

Lincoln Oil Co. No. 1 Derr, NW NW SW sec. 13-5s-8w. Spudded.

Massad & Swansberger No. 1 Barrett, NE cor. SE SE sec. 14-6s-6w. T.D. 200 ft.; S.D.

Mid-Continent Oil Co. No. 1 Reid, C SW NW sec. 32-6s-4w. T.D. 1,807 ft., contract depth; D.&A.

Johnston County

Patton et al No. 1 McCrummens, SW SW NE sec. 16-1s-6e. T.D. 580 ft.; mvg. in csg.

Love County

Amerada Pet. Corp. No. 1-A Westheimer & Daube, SW SE SW sec. 27-6s-2e. T.D. 7,363 ft.; P.B. 2,970 ft.; perforated csg. at 1,539-99 ft. and 2,095-2,115 ft.; cmtd. perf.; flwd. 22 bbls. in 24 hrs. and "went dead"; S.D.O. Aug. 4.

W. H. Riddle et al No. 1 Johnson, C SW SE cor. sec. 20-8s-2w. T.D. 4,009 ft.; waiting for tools; will deepen.

Sinclair Prairie Oil Co. No. 1 Stockton, SE SE SW sec. 26-6s-2w. T.D. 8,583 ft.; shot 20 qts., 6,900-27 ft.; no increase; swbd. 40 to 50 bbls. daily.

Marshall County

Magnolia Pet. Co. No. 1 Gardner, NE NE NW sec. 34-6s-6e. Viola 2,525 ft.; drlg. 2,595 ft.

Stuart & Taylor No. 1 Chestnut, NE cor. sec. 23-8s-5e. O.W.D.D.; drlg. 750 ft.

Murray County

Power Oil Co. et al No. 1 Lancaster Trust, C SW NE sec. 10-1s-2e. T.D. 3,203 ft.; S.D. for rotary tools.

J. Ben Russell No. 1 fee, SE SE NW SE sec. 9-2s-3e. Drlg. 500 ft.

Stephens County

Jack Cohen No. 1 Pierce, NE NE NW sec. 24-2s-6w. T.D. 268 ft.; S.D. for fuel.

Coline Oil Co. No. 1 Johnson, SW SE NE NE sec. 1-2n-8w. Cd. 5,660-5,789 ft.; rec. sh. and sd., some oil stained; drlg. 5,800 ft. in sh.

H. J. Edwards No. 1 Frederick, SW cor. NE SE NW sec. 31-2n-8w. T.D. 2,508 ft.; S.D. for bailers.

Ed Parson No. 1 Olson, C SW SW sec. 21-2-8w. Cd. and drld. 6,733-71 ft.; stains and odor of oil; to test.

Tillman County

Indian Terr. Ill. Oil Co. No. 1 Hatler, C SW NE sec. 32-2s-17w. Base Cong. 3,985 ft.; sdy. L. 4,060 ft.; cd. and drlg. to 4,074 ft. in brown dolomite L.; showed mud on D.S.T.; drlg. ahead.

Lynn Oliver No. 1 Rilling, SE SE NW sec. 22-1s-15w. Granite Wash 1,275-78 S.O.; T.D. 1,314 ft. S.D.

Shirley Clum et al No. 1 Moricle, NW NW SE sec. 16-4s-14w. Drlg. 2,330 ft.

ARKANSAS

Clark County

John G. Wooten No. 1 Z. T. Sparkman, sec. 1-11-20. Cd. sd. 560-63 ft.; small show; prep. to set csg.

Cleveland County

J. R. Lockhart No. 1 Ida Robertson, SE cor. sec. 36-10-11w. Drlg. 3,005 ft.

Grant County

Wallace & Staples No. 1 W. F. Davis, SE SE NW sec. 23-6-15. Drlg. 2,056 ft.

Hempstead County

Root Pet. Co. No. 1 D. F. Jones, 330 ft S and W, NE SW NE sec. 16-13-23. Drlg. 2,600 ft.

Miller County

Harber & Parks No. 1 Dean, NW SE sec. 24-15-26. T.D. 4,249 ft.; cg. oil sd.

Odell Hinson No. 1 Montana Realty Co., 330 ft. S and W NE NW NW sec. 3-17-[illegible]. Dropped drill pipe; S.D.; T.D. 5,325 ft.

C. V. Lenz No. 7 Dale, O.W.D.D., sec. 24-15-26. T.D. 4,215 ft.; 2,000 ft. oil in hole; W.O.S.R.

Nevada County

Benedum & Trees No. 1 Block, NE NE SE sec. 9-14-20. Drlg. 990 ft.

Benedum & Trees No. 1 Fincher, NW SW NE sec. 10-14-20. Comp.; pmp. and flw. 1,043 B.P.D.; T.D. 2,150 ft.

Benedum & Trees No. 2 C. C. Fincher, SW SW NE sec. 10-14-20. Drk.

Benedum & Trees No. 4 Grove, SE SW NW sec. 10-14-20. Drk.

Benedum & Trees No. 5 Grove, NE SW NW sec. 10-14-20. T.D. 2,138 ft.; set csg.; W.O.C.S.

Benedum & Trees No. 6 Grove, SW NE NW sec. 10-14-20. Drk.

Benedum & Trees No. 7 Grove, NW SW NW sec. 10-14-20. Drk.

Benedum & Trees No. 8 Grove, SW SW NW sec. 10-14-20. Drk.

Benedum & Trees No. 9 Grove, NE NE SW sec. 10-14-20. Drk.

L. M. Glasco No. 1 Ritchie Est., NW NW SE sec. 10-14-20. Comp.; pmpd. 55 B.P. D.; T.D. 1,271 ft.

John R. Lewis No. 1 W. Haynie, SW SW NE sec. 5-14-20. 10-in. cmtd. 196 ft.; W.O.C.S.

Steel & Warmack No. 1 Wm. Haynil, SE SE NW sec. 6-14-21. S.D. 200 ft.

Ouachita County

J. D. Reynolds No. 2 P. C. Grayson, Lot 4, Blk. 10, Stephens Sur., sec. 21-15-19. Drlg. 1,160 ft.

C. M. HEETER, SONS & CO., INC.

MAIN OFFICE AND WORKS, BUTLER, PA.

"Heeter's" Packers and Swabs

Heeter's Improved Patent Swabs, Corrugated Friction Sockets, Wire Line Pumping Outfits, Sand Pumps and other Gas and Oil Well Materials.

J. D. Reynolds No. 2 M. V. Lenehon, NW SE SW sec. 36-15-16. Comp.; pmp. 10 B.P.D.; T.D. 2,014 ft.

Pope County

Arkansas-La. No. 1 Smith, sec. 10-8n-21w. Drlg. 3,650 ft.

Union County

Fenn-Ark. Corp No. 1 W. N. Raulston. 330 ft. S and E, NW NW SE sec. 12-17-14. T.D. 2,810 ft.; S.D. rig repairs.

S. H. A. Oil Corp. No. 1 H. D. Warren, NE SW SW sec. 10-17-14. T.D. 3,494 ft.; cg. wtr. sd.

Pulaski County

G. L. Kilselman No. 1 fee, SE SE SW sec. 2-1-13. S.D. 780 ft.

LOUISIANA

NORTH LOUISIANA PROVEN

Caddo-Rodessa

Ark.-La. Gas Co. No. 2 Teamer, NW SE SW sec. 13-23-16. Drlg. 4,010 ft.

Idessa Oil Co. No. 1 D. K. Sumner, NW SW SE sec. 10-23-15. T.D. 6,197 ft.; swbd. dry; W.O.

J. Edw. Jones No. 2-A Sharp, SW SE sec. 4-23-16. Loc.

J. Edw. Jones No. 3-A Sharp, SW SE sec. 4-23-16. Loc.

J. Edw. Jones No. 1-B Sharp, 297 ft. N, 151 ft. W of C sec. 4-23-16. R.U.

J. Edw. Jones No. 2-B Sharp, 893 ft. N, 60 ft. W, C sec. 4-23-16. Loc.

Lion Oil Ref. Co. No. 6 Wynn, NE SW SE sec. 9-23-15. T.D. 6,060 ft.; rng. csg.

Lion Oil Ref. Co. No. 7 Wynn, NE SW sec. 9-23-15. Drlg. 5,850 ft.

Magnolia Pet. Co. No. 10-A Caddo Lvy. Bd., NE NW sec. 21-23-16. R.U.

Magnolia Pet. Co. No. 11-A Caddo Lvy. Bd., SW cor. sec. 21-23-16. Loc.

Magnolia Pet. Co. No. 2-A Caddo Lvy. Bd., SE cor. sec. 21-23-16. Loc.

Magnolia Pet. Co. No. 7 Foscue, NE cor. sec. 22-23-16. Drlg.

R. W. Norton No. 1 Payne, C SE SE sec. 27-23-16. Drlg. 6,425 ft.

R. W. Norton No. 2 Starke, 660 ft. N and E, SW sec. 16-23-16. Drlg. 4,965 ft.

Phillips Pet. Co. No. 2 Interstate, 330 ft. S and W, NE NW sec. 16-23-15. 7-in. cmtd. 6,111 ft.; T.D. 6,129 ft.; W.O.C.S.

Phillips No. 3 Rose McDonald, NE cor. sec. 17-23-15. Drlg. 4,850 ft.

Standard Oil Co. of La. No. 1 J. R. Hardin, 660 ft. N and E, C sec. 16-23-16. Drlg. 3,480 ft.

United Gas No. 6 Brewer Unit, 655 ft. S and E, NW sec. 21-23-16. Drlg. 3,316 ft.

United Gas No. 5 fee 574, 655 ft. S and W, C sec. 16-23-16. Drlg. 1,503 ft.

United Gas No. 3 Gibson Unit, 656 ft. N and E, SW SW NW sec. 15-23-16. 7-in. cmtd. 5,967 ft.; T.D. 5,983 ft.; W.O.C.S.

United Gas No. 4 Harris, NW NW SE sec. 15-23-16. Tstg.; T.D. 6,018 ft.; swbg.

United Gas No. 2 McCoy, 656 ft. N and W, SE SE NE sec. 16-23-16. Comp.; flw. 16 B.P.H.; T.D. 5,990 ft.

United Gas No. 3 W. M. Mitchell, NE cor. 112-ac. tr., sec. 20-23-16. Drlg. 2,150 ft.

United Gas No. 1 Stephens, 655 ft. S and W, NE sec. 20-23-16. Drlg. 500 ft.

N. LOUISIANA WILDCATS

Bienville Parish

DeSoto O. & G. Co. No. 1 Dunn and Olsen, C N½ NW¼ sec. 15-16-10. 7-in. cmtd. 5,137 ft.; T.D. 5,235 ft.

Lide & Greer No. 1 Smelley, 220 ft. N, 160 ft. W, SE SW NE sec. 13-16-5. Drlg. 4,144 ft.

McDowell et al No. 1 Locke, NE cor. sec. 9-15-10. S.D. 1,301 ft.

Seaboard No. 1 McGee, 660 ft. N and E, C sec. 3-16-6. Drlg. 6,576 ft.

Bossier Parish

Ark.-La. No. 1 W. H. Davis, 660 ft. S, 1,270 ft. E, NW NE NW sec. 8-17-11. Drlg. 3,550 ft.

Ark.-La. Gas No. 1 P. Potter, SW sec. 8-17-11. Cmtd. 9-in. 2,535 ft.; W.O.C.S.

La. Pet. Corp. et al No. 1 Edwards Est., NW SW sec. 5-17-11. R.U.

Plain Drlg. Synd. No. 1-B S. H. Bollinger, SE SW NE sec. 36-23-13. R.U.

Tidwell et al No. 1 Natting, sec. 15-22-14. 7-in. cmtd. 5,965 ft.; cor. T.D. 2,954 ft.; blg. to test.

Triangle Drlg. Co. No. 1-I Skannal, NE cor. sec. 22-17-12. R.U.

United Gas No. 1 H. G. Freeman, SE cor. sec. 15-17-12. R.U. and S.D.

United Gas No. 1-H A. C. Skannal, NE SE sec. 26-17-12. Loc.

Caddo Parish

Bayou State No. 3 S. Jolly, 700 ft. S and E, NW NW SW sec. 22-22-15. Comp.; pmp. 8 B.P.D.; T.D. 1,050 ft.

W. D. Chew No. 1-D Levee Bd., NW SE NE sec. 34-21-16. Prep. to drill deeper; T.D. 931 ft.

Paul Cooper No. 1 Rodgers, NW SW SW sec. 11-20-15. Drlg. 250 ft.

Custer Oil Co. No. 1 Wemple, N½ NW sec. 14-20-15. Drlg. 1,245 ft.

Gulf Ref. Co. No. 1 E. P. Hatcher, 660 ft. N and E, SW cor. SE¼ sec. 11-17-15. Drlg. 7,810 ft.

B. F. Laney No. 1 Taylor, SW SE SW sec. 17-21-14. Drlg. 795 ft.

Lawrence Potter No. 1 Head, NE NE sec. 26-21-15. Drlg. 2,290 ft.

F. L. Luckett No. 1 Connell, SW NE sec. 10-20-15. 6-in. cmtd. 2,174 ft.; T.D. 2,203 ft.; blg. to test.

Maja Oil Co. No. 1 Hyman, 950 ft. W, 860 ft. N, SE cor. sec. 10-20-15. Drlg.

Maja Oil Co. No. 2 Self, SE NE SE sec. 10-20-15. Loc.

Matt M. Press No. 1 Keller, SE cor. sec. 10-20-15. Tstd. dry; drlg. 2,255 ft.

Rodgers et al No. 1 Thompson, NW SW SW sec. 11-20-15. Drlg. 173 ft.

Simplex No. 10 Youree, NW SW sec. 7-20-14. 10-in. cmtd. 80 ft.; W.O.C.S.

Stanolind O. & G. Co. No. 8 Christian, SE NW sec. 27-21-15. Loc.

Stanolind No. 115 Dillon, SW SE sec. 14-21-15. 5-in. cmtd. 1,478 ft.; W.O.C.S.

Stanolind No. 116 Dillon, SE SE sec. 14-21-15. R.U.

Stewart No. 1 Morgan, SW NE sec. 10-20-15. Drlg.

Morefield & Prine No. 3 Stokeley, sec. 5-20-16. 6-in. cmt. and perf.; T.D. 957 ft.; W.O.C.S.

Shreveport Oil Co. No. 8-B Muslow, SW NW sec. 4-20-15. T.D. 2,150 ft.; W.O. S.R.

Stanolind O. & G. Co. No. 114 Dillon hrs., 65 ft. N, 816 ft. E, SW SE NE sec. 14-21-15. Comp.; pmpd. 120 B.P.D.; T.D. 1,674 ft.

J. J. Thompson No. 1 Gamm, NE SW NW sec. 35-21-15. S.D. 1,320 ft.

Catahoula Parish

Balcones Corp. No. 1 T. J. Chisholm, 1,500 ft. N, 2,500 ft. W, SE cor. sec. 19-10-8e. Drlg.

Claiborne Parish

Max Hirsch et al No. 1 C. O. Ferguson, 2,640 ft. N, 1,000 ft. E, SW cor. sec. 29-22-6w. Drlg. 2,550 ft.

E. T. Oakes No. 1 H. W. Patton, NE cor. sec. 1-20-5. T.D. 5,379 ft.; swbg. and flwg.; tstg.

United Gas et al No. 1 R. Simms, NW cor. sec. 32-20-5w. Drlg. 510 ft.

De Soto Parish

Chamberlin et al No. 1 Lanier, 280 ft. N and E, SW NE sec. 29-11-11. Drlg.

Coleman Gas Co. No. 1 Taylor, SW SW sec. 18-12-11. T.D. 872 ft.

Fite et al No. 1 Ramsey, sec. 36-11-11. S.D.; W.O.; T.D. 1,786 ft.; hole clean.

Gulf Ref. Co. No. 36-A Jenkins, SE cor. sec. 2-12-12. Loc.

Peral Oil Co. No. 1 Joyner, SE NW SW sec. 28-11-12. Drlg. 2,023 ft.

Rio Rajo Oil Co. No. 7 Prudhomme, SE cor. sec. 20-12-11. Drlg. 1,250 ft.

Stillers et al No. 2 Jenkins, 330 ft. S and W, NE SE NW sec. 35-13-12. S.D. 2,503 ft.; fuel.

R. M. Sundby No. 1 A. P. Garland, NW SW sec. 7-14-14. Drlg. 2,875 ft.

Vaughn Prod. Co. No. 1 Sample, 330 ft. N and E, SW NE SE sec. 24-11-14. Drlg. 1,600 ft.

Grant Parish

Cane River Prod. Co. No. 1 Swope, SW NW sec. 17-9-1e. T.D. 1,609 ft.; W.O.S.R.

Grant Oil Corp. No. 1 Holmes, 300 ft. N, 150 ft. E, SW NE SW sec. 17-9-1e. T.D. 1,609 ft.; 6-in. cmt. 1,601 ft.; W.O.C.S.

Kirby et al No. 1 Maxwell, 150 ft. N, 300 ft. W, SE SW sec. 9-9-1e. 6-in. cmtd. 1,540 ft.; T.D. 1,540 ft.; W.O.C.S.

Perry et al No. 1 Barrett, 150 ft. N and W, SE NE SE sec. 17-9-1e. T.D. 1,604 ft.; 6-in. cmt. 1,583 ft.; W.O.C.S.

T. W. Tannin No. 1 Kees, SE sec. 18-9-1e. T.D. 1,609 ft.; W.O.S.R.

Morehouse Parish

S. D. Hunter No. 11 Allison, 4,402 ft. E, 2,423 ft. S, NW cor. sec. 1, in sec. 47-20-4e. Loc.

S. D. Hunter No. 12 Allison, 3,388 ft. E, 1,144 ft. N, SW cor. sec. 36, in sec. 37-21-4e. 5-in. cmtd. 2,182 ft.; W.O.C.S.

Interstate Fee No. 56, NE cor. sec. 27-20-3e. Loc.

United Carbon No. 3 Crossett, 641 ft. N and W, SE sec. 19-21-5e. Drlg. 2,240 ft.

LaSalle Parish

Ark Fuel No. 13-B Urania, NW NE NE sec. 18-10-2e. R.U.

Ark Fuel No. 14-B Urania, NE cor. sec. 18-10-2e. Loc.

Natchitoches Parish

Ivan A. Allen No. 1 Simpson, sec. 12-7-7. Fsg. for D.S.; T.D. 2,200 ft.

Ouachita Parish

United Carbon No. 7 Neston, NE cor. sec. 32-19-4e. R.U.

Red River Parish

Gulf No. 25 Kennedy, NW cor. sec. 24-13-11. Drlg. 1,041 ft.

W. J. Hunter No. 1 Long Bell Lbr. Co., sec. 19-13-9. T.D. 3,733 ft.; tstg.

Peria Oil Co. No. 1 DeLong, 330 ft. S and E, C sec. 33-12-10. S.D. 1,838 ft.

Richland Parish

Gulf Ref. Co. No. 15 R. R. Rhymes et al, sec. 32-17-6e. Drlg. 8,418 ft.

Sabine Parish

Blue Lake Oil Co. No. 1 Delaney & Wheless, NW SW sec. 31-9-13. T.D. 1,851 ft.; tstg.

A. L. Braden et al No. 1 Graham, SE NE sec. 19-9-13. T.D. 1,710 ft.; tstg.

F. G. Cox No. 1 Whitney Corp., C NW NE sec. 8-9-13. T.D. 4,365 ft.; P.B. 5,503 ft.; drk. moved; well shut in; not gauged.

Earl F. Fox No. 1 Blankenship, NE SE NW sec. 13-9-12. Drk.

Hunter Co. et al No. 18 Sabine Ld. Co., SE sec. 28-8-13. Drlg. 2,555 ft.

J. R. Keen No. 1 Long Bell, 276 ft. N and 288 ft. W, SE cor. NE SW sec. 5-18-13. Acidized; W.O.S.R.

Posey Sisters Oil Co. No. 3 Burkett, NE cor. sec. 10-9-13. S.D. 3,234 ft.

L. Swift No. 1 Long Bell, NW SE SW sec. 11-8-14. Drlg. 1,810 ft.

Willis & Dowden No. 1 Lynch, SW NE SW sec. 29-9-13. Drlg. 600 ft.

Union Parish

Interstate Nat. Gas No. 58 fee, 4,620 ft. N, 700 ft. W, SE sec. 1-20-3e. Comp.; 8,000,000 ft. gas; T.D. 2,206 ft.

Interstate Nat. Gas. No. 61 fee, SE sec. 1-20-3e. 8-in. cmtd. 758 ft.; W.O.C.S.

Interstate Nat. Gas Co. No. 62 fee, SE cor. sec. 36-21-3e. 12-in. cmtd. 178 ft.; W.O.C.S.

Interstate Nat. Gas No. 16 Grayling, 660 ft. N, 1,375 ft. W, SE cor. sec. 20-21-4e. R.U.

So. Carbon Co. No. 17 Grayling, SW cor. sec. 21-21-4e. Loc.

So. Carbon No. 18 Grayling, SE cor. sec. 20-21-4e. Loc.

Webster Parish

Magnolia Pet. Co. No. 5 J. Cox, SW SE sec. 23-21-10. Drlg. 7,525 ft.

Ohio Oil Co. No. 1 R. M. Coyle, NE SE sec. 22-21-10. Drlg. 7,681 ft.

Ohio Oil Co. No. 1 Bodcaw Lbr. Co., C NE SE sec. 28-21-10. Drlg. 8,016 ft.

Red Hawk Oil Co. No. 1 Mayfield, sec. 9-23-9. Drlg. 2,215 ft.

Standard Oil Co. of La. No. 1 E. Firdecker, 1,320 ft. E, 1,316 ft. S, NW cor. sec. 2-17n-9w. Drlg. 5,502 ft.

Tide Water No. 1 L. Pipes, NE SE sec. 10-18-10. 9-in. cmtd. 3,535 ft.; T.D. 3,925 ft.

United Gas No. 2 Davis, 660 ft. S and E, NW cor. sec. 23-21-10. Drlg. 7,378 ft.

United Gas No. 1 Mixon, SE SW sec. 22-21-10. Drlg. 7,378 ft.

Woodley Pet. Co. No. 2-B L. C. Cox, cen. SW SW sec. 23-21-10. Comp.; flw. 120 bbls. distillate per day; 8,000,000 ft. gas; T.D. 5,557 ft.

SOUTH LOUISIANA FIELDS

Ansela Butte—St. Martin Parish

Stanolind O. & G. Co. No. 1 Patin, sec. 46-9s-5e. Drlg. sd. and clay 115 ft.

Bay St. Elaine—Terrebonne Parish

Texas Co. No. 13 State, sec. 17-22s-18e. R.U.

Bayou Mallett—Acadia Parish

Superior Oil Prod. Co. No. 1 Savoie, sec. 47-7s-1e. Drlg. sh. 6,000 ft.

Caillou Island—Terrebonne Parish

Texas Co. No. 33 State, sec. 20-23s-20e. T.D. 4,941 ft.; P.B. and S.T.; drlg. sh. 3,730 ft.

Texas Co. No. 31 State, sec. 20-23s-20e. Cg. oil sd. 4,740 ft.; no report.

Charenton—St. Mary Parish

Mike Hogg et al No. 1 Laws Realty Co., sec. 30-13s-10e. Spudded.

Choctaw—Iberville Parish

Standard Oil Co. No. 6 Gay, sec. 52-9s-11e. Drlg. sh. 2,637 ft.

Cameron Meadows—Cameron Parish

Burton Sutton Oil Co. No. 16 Sch. Ld., sec. 16-14s-13w. Set 10¾-in. csg.; T.D. 3,549 ft.; 7-in. csg. 3,529 ft.; tested S.W.; drlg. deeper.

Burton Sutton Oil Co. No. 17 School Ld., sec. 16-14s-13w. Drlg. sh. and L. 3,515 ft.

Magnolia Pet. Co. No. 19 Cameron Meadows, sec. 21-14s-13w. Drlg. sh. 1,857 ft.

Darrow—Ascension Parish

Humble O. & R. Co. No. 4 Community, sec. 33-2e. Drk.

Humble O. & R. Co. No. 8 Gumble. Drlg. sh. 5,285 ft.

Dog Lake—Terrebonne Parish

Texas Co. No. 4 State, sec. 5-22s-16e. Drlg. sdy. sh. 5,012 ft.

Fausse Point—Iberia Parish

Texas Co. No. 2 State, sec. 35-11s-8e. 7-in. csg. 6,444 ft.; drlg. sh. 6,673 ft.

Garden Island—Plaquemines Parish

Texas Co. No. 20 State, sec. 37-23s-33e. Drlg. sh. 5,612 ft.

Gillis—Calcasieu Parish

Fohs Oil Co. No. 16 Castle, sec. 13-9s-8w. T.D. 7,055 ft.; 7-in. csg. 7,055 ft.; comp.; no gauge.

Fohs Oil Co. No. 1 Daharsh, sec. 14-9s-8w. Drk.

Union Sulphur Co. No. 11 Barbe, sec. 1-9s-8w. T.D. 6,735 ft.; I.P. 420 B.P.D. through ¼-in. ck.

Union Sulphur Co. No. 12 Barbe, sec. 1-9s-8w. Drlg. sh. 7,115 ft.

Union Sulphur Co. No. 2 Bel, sec. 12-9s-8w. T.D. 6,788 ft.; P.B. 5,271 ft.; sidetracked; drlg. sh. 7,652 ft.

Union Sulphur Co. No. 10 Powell, sec. 29-7s-2w. T.D. 6,768 ft.; swbg.

Union Sulphur Co. No. 11 Powell, sec. 12-9s-8w. Loc.

Union Sulphur Co. No. 13 State, sec. 12-9s-8w. Drk.

Union Sulphur Co. No. 15 State, sec. 12-9s-8w. Drk.

Hackberry—Cameron Parish

W. T. Burton Oil Co. No. 1 R. L. Lewis, sec. 22-12s-10w. Spudded.

Gulf Oil Corp. No. 22 Erwin, sec. 12-12s-10w. Drlg. sd. 5,753 ft.

Independent Oil Co. No. 1 Sanner, sec. 29-12s-10w. S.D. 865 ft.

Stanolind O. & G. Co. No. 3 Duhon, sec. 22-12s-10w. T.D. 4,775 ft.; 7-in. csg. 4,755 ft.; W.O.C.

Stanolind O. & G. Co. No. 24-B Gulf Ld., sec. 14-13s-10w. Drlg. sd. and sh. 5,437 ft

Stanolind O. & G. Co. No. 7-A School Ld., sec. 16-12s-10w. 10¾-in. csg. 1,969 ft.; T.D. 5,485 ft.; P.B.; prep. to sdtrk.

Sutton Joint Interest No. 1 Portie, sec. 22-12s-10w. R.U.

Texas Co. No. 20 State, sec. 12-12s-10w. Drlg. sh. 2,837 ft.

Union Sulphur Co. No. 42 Walkins, sec. 13-12s-10w. R.U.

Iowa—Cameron Parish

Shell Pet. Corp. No. 21 Heyd, sec. 13-9s-7w. T.D. 6,753 ft.; I.P. 435 B.P.D. through 14/64-in. ck.; T.P. 975 lbs.; C.P. 1,525 lbs.

Jeanerette—St. Mary Parish

Herton Oil Co. No. 6 Banta, sec. 40-13s-9e. Drlg. sh. 6,015 ft.

Herton Oil Co. No. 4 Roane, sec. 40-13s-9e. T.D. 6,650 ft.; 7-in. csg. 6,642 ft.; comp.; no gauge.

A. U. Morrison No. 1 Matilda Plantation, sec. 70-13s-9e. Drlg. 1,618 ft.

Philtop O. & G. Co. No. 1 Eaves, sec. 70-13s-9e. M.I.R.

Jennings—Acadia Parish

Cosmo Pet. Co. No. 4 Jennings Clemont, sec. 46-9s-2w. T.D. 3,204 ft.; rng. electrical cg. test.

Shell Pet. Corp. No. 2 Community, sec. 40-9s-2w. Drlg. sh. 6,304 ft.

Stanolind O. & G. Co. No. 18 Houssiere-Latrelle, sec. 47-9s-2w. Drlg. 1,530 ft.

Superior Oil Prod. Co. No. 1 Jennings-Heywood, sec. 41-9s-2w. Cg. sh. 6,700 ft.

Superior Oil Prod. Co. No. 2 Leckcit, sec. 42-9s-2w. R.U.

Lafitte—Jefferson Parish

Texas Co. No. 5 Rigolettes, sec. 29-17s-24e. T.D. 10,942 ft.; stuck pipe while rm. at 10,932 ft. Sidetracked at 7,032 ft. drlg. sh. 10,312 ft.

Texas Co. No. 6 Lafitte, sec. 20-17s-24e. Dig canal.

Texas Co. No. 1 R. C. Milling, sec. 20-17s-24e. Cd. sd. shwg. oil 9,946-74 ft.; cg. 10,000 ft.

Texas Co. No. 6 Rigolettes, sec. 39-17s-24e. Dig canal.

Lake Barre—Terrebonne Parish

Texas Co. No. 37 Lake Barre State. Drlg. sd. 8,315 ft.

Lake Hermitage—Plaquemines Parish

Gulf Oil Corp. No. 6 LaFourche, sec. 11-8s-25e. T.D. 3,039 ft.; sdtrkd.; drlg. sh. and shells 2,334 ft.

Lake Pelto—Terrebonne Parish

Texas Co. No. 15 State, sec. 17-23s-18e. Drlg. sh. 7,015 ft.

Leesville—Lafourche Parish

Carter-Michael No. 1 E. S. Bernard, sec. 26-21s-22e. Drlg. sd. 4,312 ft.

Gulf Oil Corp. No. 1-A City of New Orleans, sec. 35-21s-22e. Drlg. sd. 214 ft.

Gulf Oil Corp. No. 4 City of New Orleans, sec. 26-21s-22e. Drlg. sd. 5,588 ft.

Texas Co. No. 50 Leesville, sec. 34-21s-22e. Cg. oil sd. 6,850 ft.; no report.

Texas Co. No. 51 Leesville, sec. 34-21s-22e. Drlg. sh. 4,327 ft.

New Iberia—Iberia Parish

Crysanthon et al No. 1 Gulf fee, sec. 71-12s-7e. T.D. 6,720 ft. R.U. to pump.

H. Fostiades No. 3 Gulf Ld., sec. 25-12s-7e. T.D. 4,600 ft.; (cor.); 7-in. csg. 4,120 ft.; comp.; no gauge.

Wm. Hellis No. 4 Boliver, sec. 56-12s-7e. R.U.

Wm. Hellis No. 3 Bullock, sec. 52-12s-7e. T.D. 4,265 ft.; P.B. 3,965 ft.; W.O.C.

Wm. Hellis No. 3 Sabatier, sec. 54-12s-7e. T.D. 2,850 ft.; W.O.C.

Wm. Hellis No. 2 Schwing, sec. 56-12s-7e. T.D. 6,761 ft.; P.B. 5,261 ft.; W.O.C.

Kitos et al No. 3 Sealy, sec. 36-12s-7e. 9⅝-in. csg. 874 ft.; drlg. sh. 4,312 ft.

Texas Co. No. 2 Bryant, sec. 25-12s-7e. T.D. 1,127 ft.; rng. surf. csg.

Texas Co. No. 1 Clementine, sec. 25-12s-1e. T.D. 7,354 ft.; salt; P.B.; sdtrkd. 4,090 ft.; drlg. sh. 5,516 ft.

Roanoke—Jefferson Davis Parish

Humble O. & R. Co. No. 3 Thomas, sec. 11-9s-4w. Drlg. 8,264 ft.

Shell Pet. Corp. No. 6 Kratzer, sec. 12-9s-4w. 10¾-in. csg. 2,454 ft.; cg. sh. 8,750 ft.

Sorrento—Ascension Parish

Sorrento Oil Co. No. 1 Bernard, sec. 9-19s-14e. Drlg. sh. 3,212 ft.

Pan American Prod. Co. No. 7 United Ld., sec. 15-10s-4e. Drlg. 5,330 ft.

St. Martinsville—St. Martin Parish

Continental Oil Co. No. 1-A fee, sec. 18-11s-6e. O.W.D.D.; S.O.; P.B. and sdtrkd.; cd. sd., shwg. oil 7,454-64 ft.; rng. elec. cg. test.

Starks—Calcasieu Parish

J. R. Turnbull No. 1 Industrial Lbr. Co., sec. 20-9s-12w. T.D. 5,570 ft.; cd. oil sd. 5,558-65 ft.; making D.S.T.; no report.

Sulphur—Calcasieu Parish

Union Sulphur Co. No. 841 fee, sec. 29-9s-8w. Drlg. sh. 3,618 ft.

Union Sulphur No. 842 fee, sec. 29-9s-10w. Drlg. sh. 2,130 ft.

Tepetate—Acadia Parish

Continental Oil Co. No. 8-A Homeseekers Dev. Co., sec. 29-7s-2w. T.D. 8,320 ft.; I.P. 141 bbls. in 15 hrs. through 3/16-in. ck.

Continental Oil Co. No. 9-A Homeseekers Dev. Co., sec. 29-7s-2w. R.U.

Continental Oil Co. No. 1-D Homeseekers Dev. Co., sec. 29-7s-2w. Drlg. sh. 6,230 ft.

Continental Oil Co. No. 1-G Homeseekers Dev. Co., sec. 22-7s-2w. T.D. 8,315 ft.; tstg.

Continental Oil Co. No. 1-A Young, sec. 29-7s-2w. Drlg. sdy. sh. 2,739 ft.

White Castle—Calcasieu Parish

Shell Pet. Corp. No. 4 Shingle, sec. 12-11s-12e. T.D. 8,394 ft.; fsg.

S. LOUISIANA WILDCATS

Acadia Parish

H. E. Dalton No. 1 Setting, sec. 17-7s-1w. S.D. 5,047 ft.

Humble O. & R. Co. No. 1 Nordyke, sec. 23. Drlg. sh. 4,706 ft.

Allen Parish

Humble O. & R. Co. No. 3 Bel, located in cratered hole, sec. 26-6s-7w. 10¾-in. csg. 165 ft.; T.D. 2,870 ft.; 7-in. csg. 2,766 ft.; shot well; failed to stop flwg. S.W.; S.D.

Avoyelles Parish

Coastal Mineral Dev., Inc., No. 1 Purdy-Hess, sec. 25-2n-3e. Drk.

George Conover No. 1 Purdy-Hess, sec. 36-2n-3e. Drk.

Frost Oil Co. No. 1 Hines Lumber Co., sec. 3-3n-4e. Drk.

Calcasieu Parish

Union Sulphur Co. No. 1 M. P. Erwin, sec. 10-10s-8w. 10¾-in. csg. 1,296 ft. Drlg. L. rk. 8,299 ft.

Wilfred Lahaye No. 1 Bass, sec. 9-10s-12w. S.D. 80 ft.

Cameron Parish

Pure Oil Co. No. 1 Mallard Bay, sec. 22-13s-3w. 18⅝-in. csg. 1,499 ft.; cg. sh. 7,835 ft.

Southern Sulphur Co. No. 2 State, sec. 29-15s-10w. S.D. 550 ft.

East Baton Rouge Parish

Cavalier Oil Co. No. 1 Vingnes, sec. 40-8s-2e. S.D. 6,623 ft.

Cavalier Oil Co. No. 1 Young, sec. 62-4s-2w. Drk.

La. Crusader Oil Co. No. 1 State University, sec. 65-7s-1w. T.D. 6,625 ft.; tstd. S.W. on D.S.T.; cg. ahead.

East Feliciana Parish

East Feliciana Oil No. 1 West & Budding, sec. 37-1s-1w. Spudded 15 ft. and S.D.

Bayou Blue—Iberville Parish

Humble O. & R. Co. No. 2-A Wilbert, sec. 74-9s-10e. Drlg. sh. 618 ft.

Iberia Parish

Jefferson Lake Oil Co. No. 413 State Lake Pigneur, Twp. 12s-5e. S.D. 1,070 ft.

Texas Co. No. 1-B State, Vermilion Bay sec. 16-15s-6e. Drlg. sh. and L. 9,922 ft.

Jefferson Davis Parish

Shell Pet. Corp. No. 1 Joe Sturdivant, sec. 25-10s-4w. 10¾-in. csg. 2,616 ft., T.D. 9,747 ft.; washing over D.S.

Stanolind O. & G. Co. No. 1 Calcasieu Natl. Bank, sec. 28-7s-3w. Drk.

Jefferson Parish

Triangle Oil Co. No. 1 Conroe, sec. 125 12s-11e. Drlg. sh. 2,312 ft.

Lafourche Parish

Wm. Hells No. 1 City of New Orleans, sec. 19-23s-23e. T.D. 5,726 ft.; fsg.

Pan American Prod. Co. No. 1 Harang, sec. 7-17s-20e. T.D. 6,977 ft.; oil sd.; rng. csg.; recvd. 180 ft. of oil on 2-min. D.S.T. 6,857-6,977 ft.

Livingston Parish

Coastline Oil Co. No. 1 Addison Trust Co., sec. 7-7s-3e. Drk.

Plaquemines Parish

Gulf Oil Corp. No. 1 Bay-Adams, sec. 25-32s-19. Drlg. sh. 2,915 ft.

Tide Water Oil Co. No. 2 Manhattan Fruit Co., sec. 34-21s-22e. T.D. 4,747 ft.; rng. cg. test.

St. Bernard Parish

Gulf Oil Corp. No. 1 Lake Lery, sec. 28-14s-14e. Drlg. sh. 3,314 ft.

Southern Sulphur Co. No. 2 State Lake Borgne, sec. 38-14s-15e. T.D. 1,104 ft.; S.D.

St. James Parish

Shell Pet. Corp. No. 2 Colonial Sugar, 4,800 ft. N of No. 1, sec. 15-12s-5e. T.D. 8,422 ft.; D.S. stuck.

St. Landry Parish

Stanley Thompson No. 1 Lewis, sec. 29-5s-6e. T.D. 6,000 ft.; abd.

Superior Oil Prod. Co. No. 1 Savoie, sec 26-8s-3e. T.D. 9,428 ft.; 7-in. csg. 6,678 ft.; perf. csg. 5,316-19½ ft.; flwd. 41 bbls. in 15 hrs. through 18/64-in. ck.

St. Martin Parish

Shell Pet. Corp. No. 1 Hefla Ld. Co., sec. 38-8s-5e. Cg. sh. 8,138 ft.

Texas Co. No. 9 St. Martin, sec. 21-8s-7e. 18⅝-in. csg. 106 ft.; drlg. 508 ft.

St. Mary Parish

Texas Co. No. 1 Horse Shoe Bayou, sec. 40-17s-9e. Drlg. sh. and L. 9,450 ft.

Terrebonne Parish

Humble O. & R. Co. No. 1 H. J. Ellender, sec. 23-19s-19e. T.D. 8,757 ft.; twisted off drill pipe; fsg.

Shell Pet. Corp. No. 1-B Realty, sec. 18 17s-15e. Cg. sdy. sh. 8,138 ft.

Vermilion Parish

Continental Oil Co. No. 1 O. C. Hebert, sec. 20-12s-3e. T.D. 11,732 ft.; circulating with mud; well tried to blow out; fsg for stuck D.S.; hole cleaned to 10,680 ft.; set cmt.; P.B. to 10,800 ft.; sdtrkd at 10,800 ft.; T.D. 12,216 ft.; rng. 5-in. csg. to test oil sd. topped at 12,197 ft.

Stanolind O. & G. Co. No. 1 Fred Stovall, 13⅝-in. csg. 1,980 ft.; T.D. 10,213 ft.; waiting fuel oil.

TEXAS

Week Ending December 26

GULF COAST FIELDS

Raccoon Bend—Austin County

Humble O. & R. Co. No. 10 Diemar, Wm. Hardy Sur. T.D. 3,522 ft.; 7-in. csg. 3,490 ft.; abd. 4,220 ft.

Humble O. & R. Co. No. 4 Duncan, J. E. Groce Sur. T.D. 4,112 ft.; I.P. 15 B.P.H. through ¼-in. ck.

Hastings—Brazoria County

W. L. Goldson No. 2 fee, B.B.B.&C. Sur. T.D. 6,088 ft.; perf. csg. 5,997-6,005 ft.; comp.; I.P. 25 B.P.H. through ¼-in. ck.

Humble O. & R. Co. No. 1 Berkheiman, B.B.B.&C. Sur. Drlg. sh. 6,080 ft.

Humble O. & R. Co. No. 1 Graham and Allen, B.B.B.&C. Sur. Drlg. L. 4,539 ft.

Humble O. & R. Co. No. 1 King, H.T.&B. Sur. Drk.

Stanolind O. & G. Co. No. 1 Blount, B. T. Masterson Sur. 10¾-in. csg. 1,675 ft. T.D. 6,080 ft.; tstg.

Stanolind O. & G. Co. No. 5-B Brown, H. T.&B. Sur. No. 29. Drk.

Stanolind O. & G. Co. No. 7 Drake, H.T. &B. Sur. No. 36. Drlg. sd. and L. 1,185 ft.

Stanolind O. & G. Co. No. 8 Ford, A.C.H. &B. Sur. Cg. sd. 5,920 ft.

Stanolind O. & G. Co. No. 7 Ford, A.C.H.& B. Sur. No. 1. Drlg. sh. and shells 1,852 ft.

Stanolind O. & G. Co. No. 1 Lang, H.T.& B. Sur. No. 29. T.D. 6,080 ft.; 7-in. csg. 5,888 ft.

Stanolind O. & G. Co. No. 2 Scott, H.T & B. Sur. No. 29. T.D. 6,080 ft.; 7-in. csg. 5,803 ft.; I.P. 20 B.P.H. through ¼-in. ck.

Stanolind O. & G. Co. No. 1 Sheffield, H. T.&B. Sur. No. 29. R.U.

Lockridge—Brazoria County

Gulf Oil Corp. No. 1 K. M. Gibson, J. W. Hall Sur. Drlg. sd. and L. 5,473 ft.

Gulf Oil Corp. No. 1 Fred Reiss, J. W. Hall Sur. Drlg. sh. 6,213 ft.

Shell Pet. Corp. No. 1 Prison Farm, J. W. Hall Sur. Drlg. sh. 1,425 ft.

Manvel—Brazoria County

Bowles & Borsodi No. 4 Norvell Co., Inc., H.T.&B. Sur. No. 23. R.U. and S.D.

Burton Drlg. Co. No. 1 C. H. Orr, A.C.H. &B. Sur. No. 92. Drlg. sh. 3,220 ft.

Harrison and Abercrombie No. 2 Stratton. Drlg. 1,830 ft.

E. A. Stone No. 1 Nichols, E. Little Sur. Drk.

Texas Co. No. 5 Leider, H. N. Little Sur. Drk.

Old Ocean—Brazoria County

Harrison and Abercrombie No. 3 Bernard River, Charles Breen Sur. 9⅝-in. csg. 6,070 ft.; drlg. sh. and L. 8,476 ft.

Heyser—Calhoun County

Humble O. & R. Co. No. 6-A P. H. Welder, J. M. Rios Sur. T.D. 5,494 ft.; tstg.

Humble O. & R. Co. No. 7-A P. H. Welder, A. Sisneros Sur. Drlg. sh. 1,059 ft.

Portilla Oil Co. No. 2-C P. H. Welder, A. Sisneros Sur. Drlg. 7,730 ft.; no report.

Portilla Oil Co. No. 6-C P. H. Welder, A. Sisneros Sur. Spudded; no report.

Anahuac—Chambers County

Gulf Oil Corp. No. 1 Acorn, sec. 45, H.& T.C. Sur. Drlg. sh. 1,993 ft.

Humble O. & R. Co. No. 10 Broussard-Hebert, sec. 59, H.&T.C. Sur. Drk.

Humble O. & R. Co. No. 11 Broussard-Hebert, sec. 59, H.&T.C. Sur. Loc.

Gulf Oil Corp. No. 1 Wilcox, sec. 48, H.& T.C. Sur. Cg. sd. 7,079 ft.

Humble O. & R. Co. No. 5 Johnson. Drlg. sh. 4,321 ft.

Humble O. & R. Co. No. 4 Marshall, sec. 50, H.&.T.C. Sur. 10¾-in. csg. 1,530 ft. T.D. 7,153 ft.; W.O.C.

Humble O. & R. Co. No. 25 Middleton, sec. 58, H.&T.C. Sur. Drk.

Humble O. & R. Co. No. 7-B White, J. McGahey Sur. 9⅝-in. csg. 1,228 ft.; drlg. sh. 6,288 ft.

Humble O. & R. Co. No. 18 White, J. McGahey Sur. T.D. 7,135 ft.; I.P. 20 B.P.H. through ¼-in. ck.

Humble O. & R. Co. No. 19 White, J. McGahey Sur. Drlg. sh. 1,295 ft.

Cotton Lake—Chambers County

Glenn H. McCarthy No. 7 Kilgore, J. Townsend Sur. Drlg. sh. 4,320 ft.

Glenn H. McCarthy No. 8 Kilgore, Townsend Sur. Drlg. sh. 1,800 ft.

Humble O. & R. Co. No. 2 Howard, Winfree Sur. Loc.

Salt Dome Oil Co. No. 1-A Lawrence, Solomon Barrow Sur. T.D. 7,008 ft.; 7-in. csg. 6,563 ft.; perf. csg. 6,532-38 ft.; washing in.

Turtle Bay—Chambers County

Stanolind O. & G. Co. No. 1 Iola Mae White, M. A. Carroll Sur. Bldg. road.

Stanolind O. & G. Co. No. 4 State, due S of Sun Oil Co. No. 1 Chambers in Turtle Bay. Drlg. sh. 3,412 ft.

Sun Oil Co. No. 3 Chambers, Chambers County Sch. Ld. Drlg. sh. 7,093 ft.

Big Creek—Fort Bend County

Gulf Oil Corp. No. 72 Davis, M. Young Sur. Drlg. sh. 1,830 ft.

Thompson Drlg. Co. No. 1 W. C. Moore, B. Wickerson Sur. S.D. 3,690 ft.

Blue Ridge—Fort Bend County

Barnett Pet. Co. No. 1-B Blakely, Lot 7, Blk. E, Drew Sur. T.D. 3,876 ft. (cor.); R.U. to pmp.

Harry Gordon et al No. 1 Blakely, E. Drew Sur. Drlg. sh. 1,800 ft.

San Jacinto Oil Co. No. 1 Bassett Blakely, E. Drew Sur. T.D. 2,650 ft.; 7-in. csg. 2,355 ft.; W.O.C.; comp.; no gauge.

Boling—Fort Bend County

Brewster Trustee No. 3 H. R. Farmer, J. Scott Sur. Drlg. sh. 1,850 ft.

Mack Hank Oil Co. No. 3-C Farmer, J. Scott Sur. Drlg. sh. 1,907 ft.

H. K. Spear et al No. 1 Kasperek, Simon Miller Sur. 7-in. csg. 3,960 ft.; T.D. 4,015 ft.; P.B. 3,882 ft.; S.D.

Orchard—Fort Bend County

Gulf Oil Corp. No. 49 J. M. Moore, Germain Immg. No. 8. Drlg. sh. 2,079 ft.

Gulf Oil Co. No. 50 Moore Germain Immg. Drlg. sd. 1,358 ft.

Thompson—Fort Bend County

J. N. Rayzor No. 1 Grimes, Kennedy Sur. T.D. 5,411 ft.; S.D.

High Island—Galveston County

Stanolind O. & G. Co. No. 60-A Cade, M. Duncan Sur. Spudded.

Stanolind O. & G. Co. No. 59-A M. Fitzsimmons Sur. T.D. 5,995 ft.; D.S. stuck.

Dickinson—Galveston County

Diadem Oil Co. No. 1 Way, P. G. Merritt Sur. R.U.

Humble O. & G. Co. No. 1 Boone, W. K. Wilson Sur. 16-in. csg. 213 ft.; T.D. 9,141 ft.; P.B. 8,126 ft.; perf. 8,106-16 ft.; I.P. 14 B.P.H. through ¼-in. ck.

Humble O. & R. Co. No. 13-A Stewart, W. K. Wilson Sur. Drlg. sd. 5,480 ft.

Kenben Oil Co. No. 3 Stewart, W. K. Wilson Sur. Drlg. sh. 3,537 ft.

Sinclair Prairie Oil Co. No. 1 W. Weems, W. K. Wilson Sur. Loc.

Smith and MacDannald No. 1 Shelar, J. O. Jones Sur. 16-in. csg. 120 ft.; 10¾-in. csg. 981 ft.; T.D. 8,260 ft.; perf. csg. 8,100 ft.; making DS.T.; tested S.W.; P. B. 7,993 ft.; perf. 7,985-90 ft.; flwd. 16 bbls. in 9 hrs. through 3/16-in. ck.; T.P. 2,660 lbs.; C.P. 2,400 lbs.

Greens Lake—Galveston County

Sun Oil Co. No. 5 Hughes, W. M. C. Baker Sur. Drlg. sh. and L. 5,335 ft.

Batson—Hardin County

Deering et al No. 5 Hooks, Donoho Sur. T.D. 5,259 ft.; 7-in. csg. 5,242 ft.; swbg.

Silsbee—Hardin County

Republic Prod.-Houston Oil Co. No. 4 fee, G. W. Brooks Sur. Spudded.

Fairbanks—Harris County

Amerada-Stanolind O. & G. Co. No. 2-C Dopslauf, W.C.R.R. Sur., Blk. 1. Spdd.

Mykawa—Harris County

Flanagan Prod. Co. No. 2 Minnetex, W. J. Lovett Sur. R.U.

West Prod. Co. No. 10 W. H. Irwin, W. B. Walker Sur. Drk.

South Houston—Harris County

Stanolind O. & G. Co. No. 2 Butz, H.T.&B. Sur. No. 6. 9⅝-in. csg. 1,426 ft.; T.D. 4,088 ft.; 5½-in. csg. 3,909 ft.; P.B.

Stanolind O. & G. Co. No. 4 Holland and Price, H.T.&B. Sur. No. 6. T.D. 4,000 ft.; 5½-in. csg. 3,906 ft.; I.P. 368 bbls. in 20 hrs. through ¼-in. ck.; T.P. 365 lbs.; C.P. 460 lbs.

Stanolind O. & G. Co. No. 2 Pittman, Tr. 27, H.T.&B. Sur. No. 6. Drlg. sdy. L. 1,028 ft.

Tysco Oil Co. No. 1 Christy Bros., H. C. Burnett Sur., sec. 4. R.U.

Tomball—Harris County

Humble O. & R. Co. No. 1 Alberts, J. House Sur. Drlg. sd. 4,521 ft.

Humble O. & R. Co. No. 1 C. E. Black, J. Pruitt Sur. T.D. 5,571 ft.; W.O.C.

Humble O. & R. Co. No. 5 H. S. Gebhard, W. Perkins Sur. Drk.

Humble O. & R. Co. No. 6 Holderrieth, J. Pruit Sur. Drlg. sh. 3,423 ft.

Humble O. & R. Co. No. 3 C. H. Mueller, T. A. Duclose Sur. Drk.

Humble O. & R. Co. No. 15 J. D. Reid, C. Goodrich Sur. R.U.

Amelia—Jefferson County

Humble O. & R. Co. No. 2 Phelan, C. Williams Sur. Drlg. sh. 3,670 ft.

Glenn H. McCarthy No. 1-B Longe, H. Williams Sur. T.D. 6,104 ft.; 5½-in. csg. 6,104 ft.; tstg.

Glenn H. McCarthy No. 2-B Longe, H. Williams Sur. T.D. 5,415 ft.; P.B. and strkd. at 3,623 ft.; T.D. 6,105 ft.; 5½-in. csg. 6,105 ft.; W.O.C.

Big Hill—Jefferson County

Stanolind O. & G. Co. No. 1 Fitzhugh, McFaddin Sur. 10¾-in. csg. 1,861 ft.; drlg. sh. 3,812 ft.

Fannett—Jefferson County

Gulf Oil Corp. No. 11 Burrell, W. H. Smith Sur. Drlg. sd. 4,055 ft.

Nome—Jefferson County

Shell Pet. Corp. No. 2 Paggi, Peveto Sur. T.D. 6,055 ft.; recvd. 720 ft. of oil on D.S.T. 5,999-6,055 ft.; I.P. 159 bbls. in 11 hrs. through ¼-in. ck.; T.P. 475 lbs.; C.P. 530 lbs.

Sun Oil Co. No. 4 Paggi, J. W. Kirby Sur. 10¾-in. csg. 1,063 ft.; drlg. sh. 4,045 ft.

Sun Oil Co. No. 5 Paggi, J. W. Kirby Sur. 10¾-in. csg. 1,137 ft.; drlg. sh. and L. 2,883 ft.

Cleveland—Liberty County

Gulf Oil Corp. No. 16-C Kirby. Drlg. sd. 5,633 ft.

Hankamer—Liberty County

Gulf Oil Corp. No. 1 Bernice Hankamer, T.D. 4,331 ft.; R.U. to pump.

Hull—Liberty County

Eclipse Oil Co. No. 1 Barrow, T.D. 5,014 ft; cut and pulled tubing to 4,000 ft.

Gulf Oil Corp. No. 22 Baldwin, J. Devore Sur. Drlg. sdy. sh. 3,676 ft.

Gulf Oil Corp. No. 71 Phoenix, T.D. 4,101 ft.; 5-in. csg. 3,731 ft.; T.D. 3,587 ft.; R.U. to pump.

Gulf Oil Corp. No. 114 Phoenix, J. Devore Sur. Drlg. sh. and sd. 3,401 ft.

Republic Prod. Co. No. 67 Dolbear, J. Devore Sur. T.D. 3,600 ft.; sdtrkd. at 2,037 ft.; drlg. sd. and sh.; no report.

Republic Prod. Co. No. 86 Dolbear, J. Devore Sur. T.D. 2,757 ft.; 5-in. csg. 2,673 ft.; comp.; no gauge.

Esperson—Liberty County

General Crude Oil Co. No. 22 Moores Bluff, M. Duncan Sur. Drlg. sh. and L. 3,212 ft.

Bay City—Matagorda County

Hamman Expl. Co. No. 1 J. H. Crocker, E. Hall Sur. 13⅜-in. csg. 1,260 ft.; 9⅝-in. csg. cmtd. at 6,500 ft.; drlg. sh. 9,450 ft.

Hawkinsville—Matagorda County

Sun Oil Co. No. 2 Craig, T. Williams Sur. Top salt 796 ft.; base salt 2,099 ft.; 18⅝-in. csg. 2,174 ft.; T.D. 2,236 ft.; W.O.C.

Markham—Matagorda County

Hamill and Hamill No. 6 Hudson, Henry Parker Sur. T.D. 4,486 ft.; abd.

Hamill and Hamill No. 6 Kountze, Henry Parker Sur. Spudded; no report.

Texas Gulf Prod. Co. No. 1 McDonald, I. &G.N. Sur., sec. 5. Spudded; no report.

Texas Gulf Prod. Co. No. 1 Hudson, Henry Parker Sur. Drlg. 2,230 ft.

Van Vleck—Matagorda County

Skelly Oil Co. No. 11-B Cobb, M. Cummins Sur. T.D. 8,258 ft.; tested S.W. 8,238-44 ft.; made squeeze job; testing 7,938-58 ft.; comp.; no gauge.

Conroe—Montgomery County

Feltex Oil Co. No. 3 Keystone Mills, L. Smith Sur. R.U.

Humble O. & R. Co. No. 1 Pressler, H. Pressler Sur. Abd. 5,259 ft.

Strake Pet. Co. No. 7-B Bean, Lynch Sur. 10¾-in. csg. 887 ft.; T.D. 5,046 ft.; I.P. 551 B.P.D. through ¼-in. ck.

Steinberger Pet. Co. No. 1 Koonce, D. W. Collins Sur. T.D. 5,102 ft.

Sun Oil Co. No. 21 Keystone Mills, L. Smith Sur. Drlg. sd. 388 ft.

Ace—Polk County

Peyton Bros. No. 1-B Kirby West Lmbr. Co., G. S. Thomas Sur. T.D. 4,900 ft.; 5½-in. csg. 4,900 ft.; W.O.C.

Greta—Refugio County

United Gas Co. No. 33 Lambert, Hardwick Sur. Cg. 5,985 ft.; no report.

United Gas Co. No. 34 Lambert, Swisher Sur. Drlg. sh. 2,330 ft.

Hewitt & Daugherty No. 36 Lambert, Swisher Sur. No. 5. Drlg. 4,530 ft.

United Gas Co. No. 12 J. J. O'Brien. Drlg. sh. 4,812 ft.

Quintana-O'Connor—Refugio County

Illinois Pet. Corp. No. 1 Heard, Ximines Sur. Spudded.

Quintana Oil Co. No. 4 Heard, T. H. Webb Sur. Drlg. 1,830 ft.

Quintana Oil Co. No. 42 O'Connor, Swisher Sur. Drlg. 5,730 ft.; no report.

Keran—Victoria County

Gulf Oil Corp. No. 9 Keran, M. Delean Sur. Drlg. sh. 5,233 ft.

Placedo—Victoria County

American Liberty Oil Co. No. 5 Cortez, J. M. Brownson Sur. No. 8. T.D. 4,775 ft.; 7-in. csg. 4,748 ft.; made gas; killed to W.O.

Barnsdall-American Liberty Oil Co. No. 6 J. M. Pickering, A. Murry Sur. Drlg. sh. 2,530 ft.

Barnsdall-American Liberty Oil Co. No. 11 Pickering and Ross, S.A.&M.G. Sur. No. 5. Cg. sh. 4,761 ft.; no report.

Magnolia Pet. Co. No. 1 Sklar, S.A.&M.G. Sur. Drlg. sh. 1,937 ft.

Ownby No. 4 Malek, S.A.&M.G. Sur. R.U.

Clay Creek—Washington County

Sun Oil Co. No. 1 H. Lauter, N. Clay Sur. 7-in. csg. 7,445 ft.; swbd. and flwd. 10 bbls. oil in 10 hrs.; drlg. 7,645 ft.

Five Corners—Wharton County

Texas Co. No. 5-B Pierce, A. H. Pierce Sur. Drlg. sh. and L. 2,329 ft.

Louise—Wharton County

Pure Oil Co. No. 4 Weaver, J. M. Brownson Sur. No. 22. T.D. 5,145 ft.; swbg.

Magnet—Wharton County

C. E. McDonald No. 1 Sweet, J. Smith & McKenzie Sur. R.U.

Pickett Ridge—Wharton County

Texas Co. No. 3 Nilson, I.&G.N. Sur. No. 307. Drlg. sd. 4,713 ft.

Withers—Wharton County

Texas Co. No. 17-C Pierce, Wm. Pettus Sur. 7-in. csg. 5,551 ft.; P.B. 5,529 ft.

Texas Co. No. 18-C Pierce, Wm. Pettus Sur. T.D. 5,555 ft.; rng. 7-in. csg.

Texas Co. No. 19-C Pierce, Wm. Pettus Sur. Drlg. sh. and L. 3,369 ft.

GULF COAST WILDCATS

Austin County

R. L. Hopkins No. 1 J. W. Recnecke, J. Stephenson Sur. R.U.

W. H. Mitchell et al No. 1 F. Fenner, J. Fitzgibbons Sur. S.D. 3,417 ft.

Brazoria County

Beatty, Bowles and Borsodi No. 1 Truska, Lot 4, Blk. 8, H.T.&B. Sur. 9⅝-in. csg. 6,430 ft.; drlg. sh. 8,599 ft.

C. B. Bunte No. 1 Fite, D. Talley Sur. 10¾-in. csg. 1,030 ft.; drlg. sh. 2,845 ft.

Texas Co. No. 1 Robbins, J. W. Brougham Sur. 11¾-in. csg. 4,950 ft.; drlg. sd. 6,675 ft.

Calhoun County

Matagorda Oil Co. No. 1 Brundet, Tr. 8, Matagorda Island. 13⅜-in. csg. at 1,826 ft.

Chambers County

Laverne Deeker No. 1 Johnson, M. O. Perkins Sur. No. 30. 10¾-in. csg. 1,295 ft.; drlg. plug.

Sun Oil Co. No. 2 Hamilton, J. T. White Sur. 13⅜-in. csg. 1,385 ft.; T.D. 8,869 ft.; 8⅝-in. csg. at 8,715 ft. Found split in csg. at 3,392-3,422 ft. Made squeeze job; drlg. plug.

Colorado County

Coyle-Concord & Sterling No. 1 Mary E. South, I.&G.N. Sur., sec. 41. T.D. 6,189 ft; 5½-in. csg. 6,187 ft.; P.B. 6,055 ft.; swabbing.

Fort Bend County

Sam Harrison No. 1 Victor Horak, H.&T. C. Sur. No. 36. Cg. 5,783 ft.

Galveston County

Shell Pet. Corp. No. 1 Maco Stewart, Spillman Sur. 9⅝-in. csg. 7,707 ft.; T.D. 10,460 ft.; P.B. 5,100 ft.; W.O.C.

Grimes County

Fred Harris No. 1 J. C. Chaney, W. Donoho Sur. 10¾-in. csg. 100 ft.; drlg. sh. 3,015 ft.

Hardin County

T. S. Deskin No. 1 Mary B. Collier, O. C. Nelson Sur. Loc.

Republic-Houston Oil Co. No. 2 Brooks, G. W. Brooks Sur. (relief well). T.D. 6,910 ft.; 7-in. csg. 6,897 ft.; W.O.C.

Harris County

Farrel and Cox No. 1 Bender, N. W. Travis Sur. R.U.

George Lawrence et al No. 1 Zoppa, J. Farwell Sur. 10¾-in. csg. 605 ft.; T.D. 6,525 ft.; S.D.

Stanolind O. & G. Co. No. 1 Warren Minerals, H.T.&B. Sur. No. 1. Loc.

Jefferson County

D. B. MacDaniel No. 1 J. N. Gilbert Est., J. Ricard Sur. Drlg. sh. 6,112 ft.

Sun Oil Co. No. 2 Broussard & Hebert, T.&N.O. Sur. T.D. 8,217 ft.; rmg. to run csg.

Lavaca County

Cole Pet. Co. No. 1 Reed-Nollkamper, A. Smothers Sur. S.D. 2,395 ft.

Welshire Union Oil Co. No. 1-A Pohl, F. Bass Sur. S.D. 1,796 ft.

Liberty County

Diadem Oil Co. No. 1 E. B. Pickett, H. T.&B. Sur. No. 10. Drk.

Matagorda County

Continental Oil Co. No. 1 Hawkins, D. McCarthy Sur. 10¾-in. csg. 1,621 ft.; drlg. sh. 3,812 ft.

Continental O'l Co. No. 2 Robbins, J. C. Franz Sur. Drlg. sd. and sh. 3,339 ft.

Glenn McCarthy No. 1 Foley, sec. 19, Susan Perkins Sur. R.U.

J. G. Mayo and Smith and McDannald No. 1 E. L. Calhoun, David Rawls Sur. Moving in.

Strake Pet. Co. No. 1 G. T. Sargent, L. E. Parker Sur. 13⅜-in. csg. 1,607 ft. T.D. 6,880 ft.; D.S. stuck; washing over D.S.

Tetts & Harris No. 1 Pierce, Lot 23, W. E. Wallace Sur. S.D. 7,723 ft.

Texas Gulf Prod. Co. No. 1 Wadsworth, D. McCarthy Sur. O.W.D.D.; T.D. 8,853 ft.; pulling 2½-in. tbg.

Montgomery County

Chapman No. 1 Foster, D. Pevy House Sur. 10¾-in. csg. 42 ft.; drlg. sh. 1,730 ft.

Polk County

J. F. Dorrance et al No. 1 Sarah Wings, sec. 15, I.&G.N. Sur. T.D. 5,194 ft.; 7-in. csg. 5,150 ft.; W.O.C.

Refugio County

Circle W. Oil Co. No. 1 Bissett, John Croskett Sur. Spudded.

Paul Meadows No. 1 Temple Lbr. Co., G. W. Main Sur. Drk.

Trinity County

Daniel E. Boone No. 1 Tullis, Wm. Watson Sur. Drlg. sh. 1,215 ft.

Cortez Oil Co. No. 1 V. and R. Kennedy, J. M. Prado Sur. R.U.

Tyler County

Republic Prod.-Houston Oil Co. No. 1 Hurd, Norman Hurd Lge. 16-in. csg. 47 ft.; 10¾-in. csg. 1,649 ft.; drlg. sh. 7,606 ft.

Victoria County

Magnolia Pet. Co. No. 1 Willie Beck, T. &N.O. Sur. 13⅜-in. csg. 920 ft.; T.D. 4,812 ft.; P.B. 4,100 ft.; 7-in. csg. 4,100 ft.; W.O.C.

Plymouth Oil Co. No. 1 J. J. Welder, S. A. Balding Sur. T.D. 6,648 ft.; P.B. and recvd. D.S.; set whipstock; prep. to mill out.

Walker County

Garland, Hartman & Page No. 1 Carey Ld. & Dev. Co., D. M. McDonald Sur. R.U.

A. U. Morrison No. 1 W. D. Nolte, Wm. Hodge Sur. Drlg. sh. 2,317 ft.

Roswell Oil Co. No. 1 J. Bosborn, J. Jordan Sur. S.D. 520 ft.

Washington County

Stapper Pet. Corp. No. 1 W. H. Hoxie, S. Clampit Sur. Drlg. sh. 2,830 ft.

S. W. TEXAS WILDCATS

Aransas County

Barnsdall Oil Co. No. 1 Kate J. Edwards, 80 ft. W line, 330 ft. S line, Lot. 87, Lamar Townsite, Wm. Lewis Sur. Drlg. 5,236 ft.

Atascosa County

Frontier Oil Co. No. 1 Oppenheimer, John Sharp Sur. Drlg. 611 ft.

Helvetia Oil Co. No. 2 S. Pratt, 333 ft. SE and SW lines tr., Garza Sur. 46. Top Serp. 3,085 ft.; T.D. 3,460 ft. P.B. 3,085 ft.; shoot.

L. G. Priest No. 1 Sanders, Garmon Sur. T.D. 1,160 ft. (cor.) S.D.

R. J. Roberts et al No. 1 Elder, 330 ft. N and W. line, Sur. 190. R.U.

Bandera County

A. T. Crane No. 1 Watson, Sur. 71. Fsg. 2,035 ft.

Bee County

Benson & Jones No. 1 Ray, Anna Burk Sur. Cg. 4,951 ft.

Blanco County

E. L. Nixon No. 1 Hornberger, 1,200 ft. S line, 300 ft. E line, Sur. 723. Drlg 447 ft.

Brooks County

California Co. No. 1 Jones, 19,800 ft. S line, 4,500 ft. W line, La Mestina Gr. Cg. 3,221 ft.

Douglass & Burden, Inc., No. 1 Haller, 300 ft. S and W lines, Sur. 436. S.D. 930 ft.

Burleson County

M. R. Exploration Co. No. 3 Fountain, Wm. Raleigh Sur. M.I.M.

Red Bank Oil Co. No. 1 Grann, 2,875 ft. S line, 1,500 ft. E line. E. Santel Sur. T.D. 6,241 ft.; swbd. sulfur wtr. and some oil; S.D.

Caldwell County

Browne Drlg. Co. No. 1 Blackwell, 409-ac. tr., J. Row Sur. Cg. 2,053 ft.

Duval County

Argo Oil Co. & John Clopton No. 1 Smith Corkill, C E¼, Sur. 61, Sat. sd. 2,841-46 ft.; tstg.

Atlantic Ref. Co. No. 1 Hamilton, sec. 37. Loc.

J. B. Blanchard No. 1 Dinn, 330 ft. N and E lines, Sur. 462. Spudded.

Kearny, Gravis et al No. 1 Holzapfel, sec. 42. M.I.M.

Magnolia Pet. Co. No. 1 Labbe ranch, 2,330 ft. W line, 2,586 ft. N line, Isc., Sur. 221. Set csg. 2,850 ft.; drlg. plugs.

Oliver Oil Co. No. 1 Shaffer, Sur. 146. Loc.

Albert Plummer No. 1 Danmier, 990 ft. S line, 330 ft. W line, NE¼ Sur. 58. T.D. 3,800 ft.; M.I. larger rig.

Thomas No. 2 Parr, NE¼ Sur. 2. Cg. sh. 4,781 ft.

Edwards County

I.T.I.O. No. 1 Love & Evans, sec. 66, Blk. 3, G.W.&P. Ry. Sur. (Workover). Prep. deepen from O.T.D. 3,002 ft. to 6,250 ft.

Plateau Oil Co. No. 1 R. L. Hatch, sec. 66, J. W. May Sur. Drlg. 4,663 ft.

Fayette County

McNeil Pet. Co. No. 1 Dybola, A. Thompson Lge. R.U.

Goliad County

Rual Singer No. 1 C. Wood, Geo. Villa Sur. Loc.

Boster Oil Co., No. 4 Runge Loan Co., B.&B. Sur. 36. R.U. and S.D.

Gonzales County

M. S. Holliday No. 1 Edwards, W. W. Page Lge. Sd. 562-69 ft.; S.O.; S.D.

Guadalupe County

Long & Ross No. 1 Feltz, Dunn Sur. T.D. 633 ft.; S.O.; S.D.

Gordon MacKenzie No. 1 Halm, 300 ft. N. line, 150 ft. W line, J. Kent Sur. D.&A.; T.D. 1,314 ft.

Hidalgo County

H. J. Porter No. 2 Sweeny Est., Lot. 1, Wayne Wood Subd. No. 2. Drlg. 6,253 ft.

Dale Smith No. 1 Fairbanks & Young, Blk. 44. Porc. 46. Jurisdiction of Reynosa. Drlg. 1,892 ft.

Jim Hogg County

S. Payne No. 1 Holbien, 150 ft. N and W lines, Blk. 10, Sh. 3, Animas Gr. R.U.

Jim Wells County

Gist & Graddy No. 1 Owens, 660 ft. N line, midway E and W lines Sur. 151. Set 7-in. csg. 2,340 ft.; fsg. 5,312 ft.

G. Tzelmelia (Putnam & Stewart) No. 1 Canales, C Blk. 32, Mosser Subd. (reinstated). S.D. 5,036 ft.

Karnes County

De Graff & Reele No. 1 Cochran, 460 ft. E line, 160 ft. S line, McConnell Lge. S.D. 225 ft.

Kerr County

S. W. Forrest No. 1 J. W. Baily, 1,000 ft. N line, 330 ft. E line, Brendle Sur. S.D. 723 ft.

LaSalle County

W. H. Vernon No. 1 Las Abias ranch, 150 ft. N line, midway E and W lines, sec. 726. S.D. 800 ft.

Lee County

Pederson et al No. 1 Turner, David Hudson Sur. T.D. 6,560 ft.; milling 3,600 ft. to sdtrk.

Live Oak County

J. H. Durbin No. 4 Marbach, S. Hays Sur. Sd. 917-22 ft.; set csg.; S.D.

Hagen & Stewart No. 1 S. A. Joint Stock Ld. Bank, 800-ac. tr., John Turner Sur. Cg. gas sd. 860 ft.

Loma Oil Co. No. 2 Cardwell, 95-ac. tr., Sparks Sur. Loc.

Martell & Sterett No. 1 Whitsett Townsite, Blk. 55, J. Houghlingan Sur. Loc.

Posey & Rountree No. 1 Turner, 510-ac. tr., S. Hays Sur. S.D. 1,100 ft.

V. G. Schimmell No. 1 Geo. West, C 150-ac. tr., J. Poitevent Sur. 231. Loc.

Sun Oil Co. No. 1 James, Pat McGlover Sur. T.D. 5,030 ft.; D.&A.

McMullen County

E. M. Jones No. 1 Ezell, 160-ac. tr., sec. 3, Thos. Adams Sur. D.S.T. 1,179-91 ft. 225 lbs. W.P. no oil in 2 min. Cg. ahead.

Martell Pet. Co. and Sterrett No. 1 Whitsett Townsite. Drlg. 317 ft.

Medina County

Joice Oil Co. No. 1-A Medina Irr. Farm Lds., Lot 1, Blk. 34, San Antonio Trust Subd. T.D. 1,740 ft.; D.&A.

A. Chmel No. 1 Odem, 160 ft. W line, 493 ft. N line tr., Castro Sur. 174. M.I.M.

R. P. Whitfield No. 1 Odem, Henry Castro Sur. 177. Cg. 697 ft.

W. H. Wycoff No. 1 Bendele, 1,275 ft. W line, 150 ft. N line, Joe Barnhart Sur. 593. Drlg. 316 ft.

Nueces County

Allen and Seaboard Oil Corp. No. 1 Chapman, 1,320 ft. N and E lines, sec. 40. (workover of old Texas Seaboard test); old T.D. 5,506 ft.; R.U. to deepen to 7,000 ft.

W. F. Morgan No. 1 Oliver Bird, 330 ft. S and W lines, 132-ac. tr., Oliver Sur. 162. Spudded.

Renwar Oil Corp. No. 1 Willoughby, 3,500 ft. SE N cor. 860-ac. tr., 330 ft. Petrovilla tr., sec. 4-G, Garret Subd. Drlg. 5,787 ft.

Geo. E. Smith No. 1 Carter, C NW¼, SE¼, sec. 8, Laurels Farms Trs. T.D. 6,557 ft.; D.&A.

Steve Paul No. 1 Smith, 1,650 ft. E line, 330 ft. S line, sec. 38, Flour Bluff Encinal Trs. Loc.

Teague et al No. 1 Poenisch, Lot 2, Blk. 32, Flour Bluff Addn. (workover of former Hurlburt test). Drk.

Wellington Oil Co. No. 1 Stockton, 300 ft. S and W lines, NE¼, sec. 25. T.D. 7,000 ft.; P.B. 6,200 ft.; to test sd.

Real County

Sun Oil Co. No. 1 Dietert, 1,980 ft. E line, 660 ft. S line, sec. 7, G.W.T.&B. Sur. Drlg. 2,731 ft.

San Patricio County

W. B. Craig No. 1 Nelson, 471 ft. NE line, 466 ft. SE line, S¼, sec. 7, 1st Addn. Loc.

Eleanor Oil Co. No. 1 W. W. Toland, sec. 15, Blk. A, Coleman-Fulton Pasture Subd. Loc.

Hooper-Rutherford, Inc., No. 1 J. D. Willis, 466 ft. S and W lines tr., Williamson Sur. S.D. 7,213 ft.

Texon Drlg. Co. No. 1 Harvey, 330 ft. N and W lines, Blk. 13, Rincon Subd., Sargent Sur. Drlg. 6,264 ft.

Windsor Oil Co. No. 1 Bissett, Tr. 3, Tivoli Subd., Crockett Sur. Loc.

Starr County

J. F. Anderson No. 1 Yzagierre, Tr. 1, Porc. 79, J. of Camargo. T.D. 2,910 ft.; S.D.

H. L. Bass No. 1 Haden, 3,740 ft. S line, 555 ft. W line, Sh. 47, Porc. 80. Set 5½-in. csg. 1,336 ft.; bailing sd. 1,326-36 ft.

J. H. Brower No. 1 Saenz, Sur. 363. S.D. 150 ft.

F. Davenport No. 1 Kelsey-Bass, 534 ft. S line, N 585-ac. tr., 2,856 ft. E line, Porc. 87. Set 1,000 ft. of surf. csg.; no report.

Davenport-Slick-Urschel No. 1 Slick Est., Davenport ranch, sec. 485. Drlg. 5,455 ft.

R. A. Mitchell No. 2 Bass, Sur. 8, Porcs. 75-77. Drlg. sh. 4,837 ft.

Moss & Heard No. 1 Ricaley, 1,500 ft. N of Highway No. 4, Porc. 83. Drlg. 1,521 ft.

Sun Oil Co. No. 1 Orr, 330 ft. N and W lines, Porc. 103. Set csg. 94 ft.; drlg. 2,312 ft.

Webb County

American Texas Oil Co. No. 1 McKendricks, Porc. 46. Drlg. 859 ft.

French Oil Corp. No. 1 Garcia, Sur. 1,121. Drlg. 2,142 ft.

Hiawatha O. & G. Co. No. 1 Southland Life, 330 ft. S and E lines, sec. 15, Agua Poquita Gr. Loc.

Lu-Tex Oil Co. No. 1-A Lone Star Constr. Co., Blk. 26, Porc. 12, 13 and 14. Drlg. 812 ft.

Paul Meaders No. 1 Garcia, Blk. 12, Sur. 1,101. R.U.

Rowan & Hope No. 2 Neal, Blk. 2, Sur. 857. Fsg. 2,405 ft.

Smith & Taggart No. 1 Jones, Sur. 674, Loc.

Superior Oil Co. No. 1 Masterson, 330 ft. S and W lines, Sur. 35. Drlg. 1,729 ft.

Wilcox O. & G. Co. No. 1 Puig, Serna Blanca Pasture, Galan Gr., Sur. 2,182. Drlg. 3,707 ft.

Zapata County

Allison et al No. 1 Bustamante, Sh. 10, Comitas Gr. Drlg. 886 ft.

Daubert & Lipscomb No. 1 Pedro de los Santos, Sh. 6, Tansler Part., Comitas Gr. Drlg. 908 ft.

Ivan Howard and R. F. Duggan No. 1 Cuellar Bros., Sur. 248. R.U.

Jennings No. 1 Martinez, Sur. 434. T.D. 150 ft.; S.D.

J. D. Long No. 1 Phelps, 200-ac. tr., Villa Gr. Drlg. 721 ft.

Zavalla County

Wilcox O. & G. Co. No. 1 Gillman, sec. 11. Spudding in.

S. W. TEXAS PROVEN

McCampbell—Aransas-San Patricio

Counties

Atlantic Ref. Co. No. 2 McCampbell, 330 ft. SE line, 1,650 ft. SW line, Isc., Lot 9, Blk. 40. M.I.M.

J. Nelson No. 1 Riggs, 330 ft. NW line, 213 ft. SW line, 6.46-ac. tr., Trs. 12 and 13, Blk. 16. Loc.

Hilbig—Bastrop County

Joe E. Mills No. 1 Askew, 600 ft. NW line, 1,525 ft. SW line, 278.5-ac. tr., Wolfenberger Sur. T.D. 2,907 ft.; S.D.

Cosden—Bee County

Elwood & Young No. 3 Barnett, John Place Sur. Sd. 3,636-53 ft.; S.O.; P.B. 3,960 ft.; T.D. 4,050 ft.; S.D.; W.O.O.

Dirks—Bee County

Blanco Oil Co. and Buchanan No. 1 Mattie Dugat, 770 ft. SE line, 150 ft. NE line, J. Grey Sur. R.U.

Gas Ridge—Bexar County

American Gas Co. No. 5 Oliver, 400-ac. tr., Rodriguez Sur. Sd. 3,285-3,309 ft.; S.O.; drlg. 3,362 ft.

Alta Mesa—Brooks County

California Co. No. 2-B Garcia, 1,395 ft. N line, 330 ft. W line, Tr. 3, La Mestua Gr. Blew out; gas sd. 2,448 ft.; making sulfur wtr., mud and gas; shut in; attempting to comp. at 2,468 ft.

Alta Verde—Brooks County

L. & W. Oil Co. No. 1 Wm. Singer, Blk. 8, Sur. 436. S.D. 185 ft.; (cor.).

Branyon—Caldwell County

Adams & Lyles No. 3 EHison, D. Cooper Sur. Cg. 2,047 ft.

Taylor Pet. Co. No. 1 Caldwell County, 4-ac. tr., D. Cooper Sur. Drlg. 566 ft.

Whisenant & Trenchard No. 1 McGee, John Neil Sur. Drlg. 1,807 ft.

McCroy—Caldwell County

Whisenant & Trenchard No. 1 McGee, John Neil Sur. Drlg. 837 ft.

Colmena—Duval County

Conservative Oil Co. No. 2 D.C.R.C.-Sents, 133 ft. N Eline, 1,200 ft. SE line, Blk. 13, sec. 51. S.D. 1,544 ft.

Driscoll—Duval County

Continental Oil Co. No. 13-A Sevier, Sur. 448. M.I.M.

El Mesquite—Duval County

Hamil & Smith No. 3 J. Benavides, Subd. 2, El Mesquite Gr. Drlg. 1,170 ft.

Rogers & Rogers No. 3 Pena, El Mesquite Gr. R.U.

Government Wells—Duval County

Magnolia Pet. Co. No. 1 Hahl, Sur. 41. Drk.

Ralph Ogden No. 10 B.C.C., N½, S½, Sur. 135. Tstg. 2,455 ft.

San Diego Oil Corp. No. 5 Bennett, 330 ft. N and E lines, SE¼, SW¼, Sur. 44. Loc.

Southwest Drlg. Co. No. 1 Hamill, Sur. 64. Set csg. on sd. 2,537 ft.; W.O.C.

Hoffman—Duval County

Bridwell Oil Co. and Gorman-Yoakam Drlg. Co. No. 1 Martinez, Sur. 118. M. I.M.

Bridwell Oil Co. No. 5-B Sutherland, Sur. 112. Loc.

Rogers & Rogers No. 4-A Hoffman, Sur. 118. Sd. 2,751-73 ft.; perf. 2,725-36 ft.; comp.; gasser.

Standard of Kansas No. 8-A Hoffman, Sur. 118. Drlg. 1,831 ft.

Kohler—Duval County

Humble O. & R. Co. No. 54-A Kohler, 330 ft. N and E lines, sec. 164. Loc.

Humble O. & R. Co. No. 2 Peters, 330 ft. N and W lines, Sur. 398. D.S.T. 2,642-60 ft.; 1,300 ft. oil in 20 min.; swbg. in.

Sun Oil Co. No. 1 Peters, 330 ft. S and W lines, Sur. 161. Set csg. 2,646 ft.; W.O.C.

Loma Novia—Duval County

Bridwell O. Co. No. 15-A Hubbard, Sur. 71. Comp.; 98 B.P.D. on pmp.; sd. 2,696-2,711 ft.

Eastern Texas Prod. Co. No. 5 Hubbard, Sur. 71. R.U.

Humble O. & R. Co. No. 24-B Hubbard, Sur. 83. Set csg. 2,760 ft.; comp.; 30.33 B.P.H.

Humble O. & R. Co. No. 25-B Hubbard, Sur. 83. Sd. 2,752-60 ft.; set csg.; W.O.C.

Humble O. & R. Co. No. 63-B Hubbard, Sur. 83. Comp.; 13.8 B.P.H.; T.D. 2,780 ft.

Humble O. & R. Co. No. 14 Vela, Sur. 42. Sd. 2,773-82 ft.; set csg.; W.O.C.

Humble O. & R. Co. No. 20-C Welder, Sur. 554. T.D. 2,724 ft.; comp.; 7 B.P.H. on pmp.

Magnolia Pet. Co. No. 51 Hahl, Sur. 67 Set csg. 2,710 ft.; comp.; 8 B.P.H. on ½-in. ck.; sd. 2,710-29 ft.

Magnolia Pet. Co. No. 52 Hahl, Sur. 67. M.I.M.

Magnolia Pet. Co. No. 8 Herbst, Sur. 70. Loc.

Rosan Oil Co. No. 4-A Hubbard, Sur. 71. M.I.M.

Lopez—Webb—Duval Counties

Cox & Hamon No. 23 Peters, Sur. 322. Comp.; 20 B.P.H.; T.D. 2,110 ft.

Cox & Hamon No. 28 Peters, Sur. 322. Comp.; 15 B.P.H.; sd. 2,116-22 ft.

Gem Oil Co. No. 1 Peal, Sur. 72. Comp.; 15 B.P.H.; sd. 2,095-2,118 ft.

Gem Oil Co. No. 2 Peal, Sur. 72. M.I.M.

Glen Harroun No. 1-A Lopez, Sur. 119. Set csg. 2,259 ft.; tstd. S.W.; cg. 2,273 ft.

Humble O. & R. Co. No. 1 D.C.R.C., Sur. 901. Loc.

Humble O. & R. Co. No. 3-C D.C.R.C., Sur. 901. Cleaning in pits 2,065 ft.

Mills Bennett Prod. Co. No. 11 Billings, Sur. 113. Sd. 2,124-47 ft.; comp.; 13 B. P.H. on ½-in. ck.

Mortimer & Springer No. 10 M. Lopez, sec. 73. Sd. 2,149-66 ft.; comp.; 360 B.P. D. on ½-in. ck.

Sierra Oil & Roy. Co. No. 2 Billings, SW¼, Sur. 113. Drlg. 2,031 ft.

Piedra Lumbre—Duval County

Magnolia Pet. Co. No. 10 D.C.R.C., Sur. 95. Spudded in.

Seven Sisters—Duval County

W. W. Blocher No. 2 Benton-Coopwood, Sur. 382. Loc.

Humble O. & R. Co. No. 16 Badgley, Sur. 307. Set csg. 2,495 ft.; comp.; 22 B.P.H.; T.D. 2,495 ft.

Humble O. & R. Co. No. 17 Badgley, Sur. 307. T.D. 2,494 ft.; comp.; no gauge.

Humble O. & R. Co. No. 18 Badgley, Sur. 307. T.D. 2,477 ft.; S.D.

Humble O. & R. Co. No. 37 Smith, Sur. 382. Pulling screen and lnr.; T.D. 2,450 ft.

Humble O. & R. Co. No. 38 Smith, Sur. 382. Comp.; 13.88 B.P.H. on ⅝-in. ck.; T.D. 2,439 ft.

Humble O. & R. Co. No. 39 Smith, Sur. 382. Sd. 2,442-50 ft.; set csg.; W.O.C.

Relience Oil & Roy. Co. No. 19 Drummond, Sur. 308. M.I.M.

Texas Co. No. 6 Badgley, Sur. 307. Set csg. 2,522 ft.; comp.; 49.8 B.P.H. on ¾-in. ck.; sd. 2,496-2,522 ft.

Texas Co. No. 7 Badgley, Sur. 307. R.U.

Wellington Oil Co. No. 18 Welder, Sur. 383. Comp. 30.84 B.P.H. on ⅝-in. ck.; T.D. 2,468 ft.

Wellington Oil Co. No. 22 Welder, Sur. 383. M.I.M.

Westheimer & Daube No. 27 Campos, Sur. 224. R.U.

Westheimer & Daube No. 26 Campos, Sur. 224. Comp.; 24.22 B.P.H. on ¼-in. ck.; sd. 2,670-2,712 ft.

Pearsall—Frio County

Amerada Pet. Corp. No. 8 Halff & Oppenheimer, S. A. Ditch Sur. 1,104. Drlg. 6,012 ft.

Amerada Pet. Corp. No. 7 Oppenheimer, 1,320 ft. W line, 330 ft. S line, Gibson Sur. 16. (W.O.); swbg. in 5,573 ft.

North Pettus—Goliad-Karnes Counties

Diamond Halff Oil Co. No. 1-C Gillette, 745-ac. tr., J. Gomez Sur. Sd. 3,668-3,876 ft.; completing.

Magnolia Pet. Co. No. 5 Weldon, 210-ac. tr., J. Gomez Sur. Comp.; 3 B.P.H. with S.W.; T.D. 3,715 ft.

Sun Oil Co. No. 7 Scarbrough, B.&B. Sur. Drlg. 2,597 ft.

Clark—Guadalupe County

Diamond Halff Oil Co. No. 2 Larison, G. DeWitt Sur. Spudded.

Marts & Bevins No. 1 Grim, G. DeWitt Sur. 13. Spudded.

W. J. Walton No. 3 Hoffman, Sowell Sur. T.D. 2,330 ft.; P.B. 2,270 ft.; comp.; no gauge.

Darst Creek—Guadalupe County

Freeman Oil Co. No. 1 Larison, G. DeWitt Sur. 13. Drlg. 1,211 ft.

Mercedes—Hidalgo County

Union Sulphur Co. No. 10 American Rio Grande L. & L. Co., Blk. 50, Tr. 2,418, N. Caprisallo Dist. T.D. 8,306 ft. Cutting tbg. 6,820 ft.

Mestanos—Hidalgo County

McCollum Explin. Co. No. 1-B Engleman, Lot 8, sec. 249. No report.

McCollum Explin. Co. No. 1 MacDougall, Lot 232, sec. 249. No report.

Samfordyce—Hidalgo-Starr Counties

Harrison & Danvers No. 2-A Guerra, 230 ft. N and E lines, Sh. 251, Porc. 38. Drlg. 217 ft.

Weekly Oil Corp. No. 3 Lula George, Sh. 13, Porc. 41. Drlg. 2,563 ft.

Colorado—Jim Hogg County

J. H. Meek, No. 3-A Martinez, 1,650 ft. E line, 1,550 ft. N line, Sur. 623. M.I.M.

Bentonville—Jim Wells County

La Jita Corp. No. 2 Bowers, 330 ft. N line, 990 ft. E line, sec. 14. D.S.T. 5,653-85 ft.; 14 stands P.L.O. 4 min. and 100 lbs. W.P.; rng. 7-in. csg.; W.O.C.; sd. 5,672-85 ft.

La Jita Corp. No. 3 Bowers, 990 ft. N and E lines, sec. 14. Drlg. 952 ft.

King—Jim Wells County

Stanolind O. & G. Co. No. 3 King, 990 ft N, 330 ft. E, NE cor. sec. 20, in sec. 9. Loc.

Premont—Jim Wells County

Francis & Simonton No. 1 A. Lozana, Jr., 185 ft. E line, 165 ft. S line, Lot 111, sec. 36. S.D. 1,036 ft.

Tom Graham and Gilcrease Oil Co. No. 1 Escobas, 330 ft. N and E lines, Blk. 4, sec. 25. Buffalo-Tex Subd., Escobas ranch, Cg. sd. 2,323 ft.

Tom Graham No. 1 Wm. Singer, C Lots 71 and 74, Sur. 76. T.D. 3,400 ft. P.B. 3,163-67 ft.; perf. 3,157-64 ft.

Sandia—Jim Wells County

Geo. Smith No. 1 Wade, Lot 2, Wade ranch. R.U.

J. E. Walsh No. 2 Wade, Lot 2, Blk. C, Bode Subd. Cg. 2,883 ft.

Kingsville—Kleberg County

Great States Oil Co. No. 1 Kivlin, Blk. 4, sec. 39. Spudded.

Lucas—Live Oak County

Houston Oil Co. No. 37 Cartwright, 1,300 ft. W, 300 ft. S. No. 35. F. Botillo Sur. T.D. 1,738 ft.; attempted blowout; S.D.; changing preventer.

Oakville—Live Oak County

Ohio Fuel Supply Co. No. 1 Rosebrocks, Romero Sur. Sd. 2,138-45 ft. Slight show O.&G.; D.S.T. 2,800-07 ft.; rec. 106 ft. P.L.O. and 100 ft. drlg. fluid; 14 min.; sd. 2,797-2,807 ft.; blew out; making gas and some 24-grav. oil; comp.; 2 B. B.H. on ⅝-in. ck. and 7,000,000 ft. gas; T.D. 2,808 ft.

Calliham—McMullen County

Conservative Oil Co. No. 13 Stitz, Hely Sur. Comp.; 14 B.P.D.; T.D. 711 ft.

Joe Coursey No. 3 Lark, Blk. 101, Scrugham Sur. S.D. 1,006 ft.

W. P. Howard No. 6 Claunch, M. Hely Sur. Cg. 427 ft.

Loma Oil Co. No. 107-A Jacob, Sur. 516. Spudding in.

National Pet. Co. No. 2-B Lark, Jacob Sur. Drlg. 135 ft.

Rhodes—McMullen County

Humble O. & R. Co. No. 2 Edrington, 330 ft. S and W lines, SE¼, Sur. 59. T.D. 3,070 ft.; D.&A.

Humble O. & R. Co. No. 3 Edrington, SE¼ Sur. 59. M.I.M.

Ina—Medina County

Ina O. & R. Co. No. 3 Viola Wilson, Durst Sur. Drlg. 400 ft.

Agua Dulce—Nueces County

Lockhart Bros. No. 1 Elliff, 4,501 ft. E line, 466 ft. S line, 3,054.9-ac. tr., Antonio Longorio Gr. Loc.

Stoddart & Moss No. 1 Colman, 330 ft. NW and NE lines, SE¼ SW 330-ac. tr., sec. 206. Drlg. sh. 6,667 ft.

Texon Drlg. Co. No. 1 Elliff, 466 ft. E line, 2,194 ft. S line, 3,054-ac. tr., A. Longorio Gr. (W.O.); R.U.

Texon Drlg. Co. No. 2 Elliff, 5,580 ft. S line, 466 ft. E line, 3,054.9-ac. tr., Antonio Longorio Gr. Loc.

Texon Drlg. Co. No. 2-B Sevier, 880-ac. tr., W. W. Chapman Lds., Palto Alto Gr. Set 16-in. csg. 300 ft.; S.D.

United Prod. Co. No. 1 Harvey, 1,100 ft. W line, 1,050 ft. N line, tr., M. Garza Sur. Loc.

Clara Driscoll—Nueces County

Blanco Oil Co. and Buchanan No. 1 W. S. Gandy, 330 ft. S and W lines, E½ sec. 60. Drlg. 4,621 ft.

Conroe Drlg. Co. and H. M. Reed No. 1 Meyers, Lot 4, Blk. F, Driscoll townsite, sec. 107. T.D. 4,505 ft.; D.&A.

Hiram Reed No. 2 Roper, C Lot 1, sec. 108. Perf. 3,901-05 ft.; gas and wtr.; to P.B. and perf. in 3,800-ft. sd. W.O.W.

Mid-Continent Pet. Corp. No. 1 Driscoll-Sevier, 330 ft. S and W lines, 160-ac. tr., E. Russell Sur. Drlg. 1,120 ft.

H. M. Reed No. 1 Holloway, 330 ft. S and E lines, 51.8-ac. tr., sec. 108. Cg. 3,813 ft.

Wellington Oil Co. No. 1-A Sevier, 125-ac. tr., Wm. Gamble Sur. Set csg.; T.D. 6,075 ft.; to perf. upper sds.

Wellington Oil Co. No. 9 Sevier, Wm. Gamble Sur. Set csg. 623 ft.; W.O.C.

Flour Bluff—Nueces County

Humble O. & R. Co. et al No. 1 Cordez, C Lot 12, Blk. 48. Loc.

Humble O. & R. Co. et al No. 1 Johnson, Blk. 22, sec. 48. Drlg. sh. 5,456 ft.

Humble O. & R. Co. No. 2 Phillips, C Lot 26, sec. 47. Set csg. 6,646 ft.; rng. tbg.

Humble O. & R. Co. No. 3 Phillips, C Lot 7, Blk. 48. Cg. 6,661 ft.

Humble O. & R. Co. et al No. 4 Phillips, C Lot 1, Blk. 55. Set csg. 216 ft.; W.O.C.

Humble O. & R. Co. et al No. 5 Phillips, C Lot 6, Blk. 48. Loc.

Humble O. & R. Co. No. 1 D. Reed, C Lot 28, Blk. 47. Sd. 6,632-52 ft.; set csg.; W.O.C.

Humble O. & R. Co. et al No. 2 Webb, Blk. 47. Drlg. 4,057 ft.

S. Paul No. 1 Moulter, Blk. 16, sec. 41, Encinal Garden tracts. Loc.

Saxet Heights—Nueces County

Wm. Brady No. 1 Perkins, C Lot 49, Country Club Pl. Sd. 4,068-83 ft.; set csg.; comp.; 140 B.P.D.

Callihan Bros. and Whitley No. 1 Hartley, Villareal Sur. R.U. and S.D.

Genro & Roosth No. 1 Caddell, C Lots 3, 4 and 5, Blk. "D," Harbor View Ests. Sd. 4,045-80 ft.; set csg. 4,080 ft.; S.D.

Chas. F. McGrew No. 3 Kelly, 19-ac. tr. Sd. 4,060-90 ft.; set csg.; completing.

Morgan Bros. No. 2 Bender, Blk. C, Harbor View Estates. T.D. 4,085 ft.; failed to flow; S.D.

W. N. Paul No. 2 Schallert, C Blk. "C," Harbor View Addn. S.D. 1,800 ft.; W.O.

Pedernal Oil Co. No. 1 John, Blk. 14, Oak Park Addn. S.D. 4,110 ft.; orders

J. D. Proctor No. 1 Simonton, 100 ft. E line, 68 ft. N line, 1-ac. tr., Lots 46 and 47, Country Club Pl. Sd. 4,070½-83 ft.; set csg.; completing.

Renwar Oil Co. and Maryland Corp. No. 2 Golla, 19.3-ac. tr., Villareal Sur. M.I.M.

Ben F. Smith No. 1 Whelan, 10-ac. tr., Villareal Gr. Drlg. 4,036 ft.

Taylor Pet. Co. No. 2 Incarnate Word College, 40-ac. tr., Villareal Gr. Drlg. 5,149 ft.

Sam Wilson No. 1 Henderson, 125-ac. tr., Blk. 4, Oak Park Addn. No report.

Sam Wilson No. 1 Vehlinger, Blk. 4, Oak Park Addn. Sd. 4,074-89 ft.; set csg. 4,089 ft.; comp.; 257 B.P.D.

Saxet—Nueces County

Allen & Morris No. 1 Hocker & Sevier, 330 ft. N Shell Rd., 330 ft. W line, 100-ac. tr. Sd. 4,823-40 ft. Tested 600 ft. oil. Set 7-in. csg. 4,833 ft.; W.O. pmp.

C. Andrade No. 2 Rand Morgan, Sur. 592. Sd. 4,554-75 ft.; tstg.

Benson Drlg. Co. No. 1 Morgan, 330 ft. N and W lines, 40-ac. tr., Sur. 315 (W.O.). Old T.D. 4,483 ft.; R.U. to D.D.

Ben-Tex Oil Co. No. 2 Harmon, 990 ft. S line, 330 ft. E line, 50-ac. tr., Sur. 416. Set sur. csg.; W.O.C.

R. B. Bryant No. 5 Frank, 660 ft. E No. 3, 330 ft. S line, Sur. 416. Sd. 5,842-54½ ft.; set csg. 5,871 ft.; plg. tbg. to clean.

Bryant & Howell No. 1 Kocurek, 330 ft. N and E lines, 58-ac. tr., Smith Sur. 25. T.D. 3,125 ft.; blew out; caught fire; cratering; making gas, mud and some oil.

R. B. Bryant No. 6 Scoggin, 330 ft. N and E lines tr., Sur. 315. Swbg. 4,572 ft.

Conservative Oil Co. No. 4-B Morgan, 330 ft. N line, 1,984 ft. W line, lse., Sur. 403. Sd. 4,195-4,202 ft.; tstg.

Conservative Oil Co. No. 3-B Rand Morgan, 330 ft. N and W lines, lse., Sur. 403. Drlg. 3,930 ft.

Tom Graham No. 2 Harmon, 330 ft. S and E lines, 34-ac. tr., Sur. 416. Drlg. 3,740 ft.

Great States Oil Co. and Violet Oil Corp. No. 7 McGregor-Belk, Sur. 311. D.S.T. 6,318-26 ft.; recd. 1,000 ft. oil, 90 ft. S.W.; sd. 6,208-26 ft.; set csg. 6,326 ft.; cleaning into pits.

Great States Oil Co. and Violet Oil Co. No. 8 McGregor-Belk, Sur. 311. Set sur. csg.; W.O.C.

Hiawatha Oil Co. No. 6 Griffith, 330 ft. S line, 3,084 ft. E line, Sur. 416. T.D. 6,802 ft.; P.B. to test sd. 6,749-59 ft.; set csg. 6,770 ft.; W.O.C.

Hiawatha Oil Co. No. 6 Hutchins-Stillwell, Blk. 30, Sheppard Farm Lots. Drlg. 5,693 ft.

Hiawatha Oil Co. No. 7 Hutchins-Stillwell, Blk. 30, Sheppard Farm Lots. Sd. 6,327-63 ft.; set csg.; drlg. plugs.

W. B. Hinton No. 4 Cole, 330 ft. N and W lines, 60-ac. tr., Villareal Sur. Sd. 4,867-76 ft.; T.D. 4,881 ft.; S.D.

W. B. Hinton No. 5 Cole, 330 ft. N line, midway between Nos. 3 and 4, 60-ac. tr., Villareal Sur. Loc.

Houston Oil Co. No. 12 McGregor, 135-ac. tr., Sur. 582. Drk.

Houston Oil Co. No. 14 Morgan, 2,310 ft S line, 330 ft. W line, 493-ac. tr. Set csg. 4,416 ft.; cleaning into pits.

Houston Oil Co. No. 15 Morgan, 493.63-ac. tr. T.D. 4,412 ft.; rmg. to set csg.

Magnolia Pet. Co. No. 4 W. W. Walton, 150 ft. S Shell Rd., 330 ft. W line lease, Page Lands Sur. Set 7-in. csg. 4,822 ft.; W.O.C.

Oso Drillers, Inc., No. 4 Roark, 660 ft. E line, 1,200 ft. S line, 106-ac. tr., Villareal Gr. Set sur. csg. 1,000 ft.; W.O.C.

Pan American Prod. Co. No. 6-A Morgan, 330 ft. N and W line, 99-ac. tr., Sur. 403. Drlg. 2,146 ft.

Pan American Prod. Co. No. 5-D Morgan, 330 ft. S and E lines, W½, SW¼, sec. 405. Cg. 5,526 ft.

Pan American Prod. Co. No. 4-C Morgan, 90-ac. tr., Sur. 403. Sd. 6,248-81 ft.; reworking; made gas and dirt.

Pan American Prod. Co. No. 3-B Sagarin, Sur. 500. T.D. 5,027 ft.; resetting whipstock.

Pan American Prod. Co. No. 1 Solar Sevier, 140-ac. tr., G.S.&F.S. Sur. D.S.T. 4,835-42 ft.; 600 ft. oil in 5 min.; set 7-in. csg.; W.O.C.

Phillips Pet. Co. No. 5 Hutchins, 60-ac. tr., Blks. 29 and 30, Sheppard Farm Lots. Set csg. on 6,300-ft. sd.; comp.; 2 B.P.H. on ⅛-in. ck.

Phillips Pet. Co. No. 4 Morgan, Sur. 405 Set 7-in. csg. 6,428 ft.; W.O.C.

Reesto Drlg. Co. No. 2 Harmon, 50 ft. SW of No. 1, Sur. 416. Spudded.

Republic Nat. Gas Co. No. 1 Hutchins, 60-ac. tr., sec. 9, Rge. 5. Set condr. csg. 180 ft.; W.O.C.

Renwar Oil Co. No. 4 Fred Franks, 20-ac. tr., Sur. 416. Drlg. 5,166 ft.

Renwar Oil Co. and Maryland Corp. No. 5 Morgan, Sur. 315. Sd. 4,417-20 ft.; tstg.

Renwar Oil Co. and Andrade No. 7 McGregor-Belk, Sur. 311. D.S.T. 6,318-26 ft.; made 900 ft. oil, 90 ft. S.W., S.G. in 5 min.

Republic Nat. Gas Co. No. 1 P. W. Alexander, 32.35-ac. tr., rec. 9, Rge. 5. Drlg. 2,137 ft.

Republic Nat. Gas Co. No. 3 A. Donigan, 240-ac. tr., secs. 6 and 7, Rnge. 5. R.U.

Republic Nat. Gas Co. No. 1 Hutchins, 60-ac. tr., sec. 9, Rnge. 5. Drlg. 3,617 ft.

Republic Nat. Gas Co. No. 2 Ordner, 219-ac. tr., Sur. 403. Set csg. 5,831 ft.; W.O.C.

Richardson Pet. Co. No. 6 Cain & Secrist, Blk. 23, Russell Farm Lots. Sd. 4,429-35 ft.; rng. csg.

Richardson Pet. Co. No. 12 Cain & Secrist, Blk. 23, Russell Farm Lots. Rng. csg. 4,447 ft.

Richardson Pet. Co. No. 7 Quiros, 80-ac. tr., Sur. 311. Set csg. 1,210 ft.; W.O.C.

Southern Minerals Corp. No. 19 Bliss, 398 ft. N line, 446 ft. W line, N 120-ac. tr., Sur. 406. D.S.T. 5,830-35 ft.; 1,500 ft. oil; comp.; 145 B.P.D.

Southern Minerals Corp. No. 7 Isensee, Sur. 404. Set csg. 911 ft.; sd. 4,405-25 ft.; completing.

Stamex O. & G. Co. No. 1 Cox & Cryder, 330 ft. N line, 990 ft. E line tr., Sur. 166 and 316. S.D. 4,000 ft.; wtr.

Taylor Pet. Co. No. 1 Baldwin, 200-ac. tr., Blk. 21, Russell Farm Lots. R.U.

Texon Drlg. Co. No. 5 Carter, 219-ac.tr., Sur. 316. Comp.; 130 B.P.D. on 5/32-in. ck.; Sil. 4,455-66 ft.

Texon Drlg. Co. No. 6 Carter, 219-ac. tr., Sur. 316. R.U.

Texon Drlg. Co. No. 1 Buckholt, 330 ft. S and E lines, 19.14-ac. tr., Sur. 402 and 316. T.D. 4,459 ft.; perf. at 4,000 ft.; sd.

Texon Drlg. Co. No. 3 Scoggin, 144-ac. tr., Sur. 315. T.D. 4,441 ft.; comp.; 200 B. P.D. on 3/16-in. ck.

W.A.R. Oil Co. No. 3 Hoelscher, Blk. 22, Russell Farm Lots. Cg. 3,912 ft.

Wynne Drlg. Co. No. 3-B Morgan, 330 ft. S and W lines, 80-ac. tr., Surs. 315 and 592. Cg. 4,435 ft.

Stratton—Nueces County

Camp Prod. Co. No. 1 Wordner, 330 ft. E line, 1,280 ft. N line, sec. 12, Stratton Subd. R.U. and S.D.

Plymouth—San Patricio County

Magnolia Pet. Co. No. 11 Corpus Christi Bank, sec. 24, Fourth Addn., Taft Lds. Drk.

Plymouth Oil Co. No. 65-C Welder, sec. 71. Sd. 6,115-19 ft.; tstg.

Plymouth Oil Co. No. 66-C Welder, sec. 71. Drlg. sh. 3,472 ft.

Plymouth Oil Co. No. 67-C Welder, sec. 48. M.I.M.

Taft Field—San Patricio County

Atlantic Ref. Co. No. 3 Pullin, 330 ft. N line, 380 ft. W line, 40-ac. tr., Lot 4, sec. 1, Second Addn. R.U.

Cage Prod. Co. No. 5 Mayo, 330 ft. S and W lines lse., J. Fessenden Sur. Drlg. 2,326 ft.

Cage Prod. Co. No. 7 Mayo, 9,560 ft. W line, 990 ft. S line, 60-ac. tr., Ottman Sur. Loc.

Conroe Drlg. Co. No. 6 Pullin, Lot 4, sec. 1. M.I.M.

Humble O. & R. Co. No. 1 Flynn, Lot 1, sec. 1, Second Addn. Cg. oil sd. 3,982 ft.

Humble O. & R. Co. No. 2 Godwin, Lot 1, sec. 23, Third Addn. Drlg. sh. 2,020 ft.

Humble O. & R. Co. No. 11 Mayo, 670 ft E line, 330 ft. S line, 320-ac. tr., Ottmar Sur. Sd. 4,895-4,910 ft.; comp.; 178 B.P. D. on 3/16-in. ck.

Humble O. & R. Co. No. 13 Mayo, 799 ft. S line, 330 ft. E line, 320-ac. tr., Ottman Sur. Set 9⅝-in. csg. 631 ft.; W.O.C.

Los Olmus—Starr County

Ted Stone No. 1 Kelsey-Bass, Porc. 87, J of Camargo. Sd. 400-08 ft.; tstg.

Margo—Starr County

Braden & Richards No. 1 L. Garcia, C 20-ac. tr., Sh. 7-B, Porc. 71. Oil sd. 394-96 ft.; S.O.; S.D.

Rio Grande City—Starr County

Sam Adams No. 1 Garza, Sh. 20-A, Porc 80. S.D. 524 ft.

Coreta Oil Co. No. 5 Doyno, Blk. 1, Tr 77-A, Porc. 81. Spudded; S.D.

Fech Oil Co. No. 12 Doyno, Blk. 4, Tr. 77-A, Porc. 81. Drlg. 1,395 ft.

Las Albercas—Webb County

Frank Garvis No. 12 Yeager-Strohman, Sh 5, Las Animas Gr. S.D.; repairs.

O'Hern—Webb County

Hamil & Smith No. 17 Benavides, Blk. 379, Hale Subd. Drlg. 1,257 ft.

Hamil & Smith No. 28 Benavides, O'Hern Subd. Tstg. sd. 2,924-36 ft.

Hamil & Smith No. 37 Benavides, O'Hern Subd. Drlg. 2,521 ft.

Hamil & Smith No. 39 Benavides, O'Hern Subd. Tstg. sd. 2,922-34 ft.

Hamil & Smith No. 40 Benavides, Hale Subd. R.U.

H. M. Reed No. 4 Benavides, Blk. 299 Hale Subd. R.U.

Starr Dev. Co. No. 1 Benavides, 330 ft. N and W lines, Sur. 173. M.I.M.

Sun Oil Co. No. 1 Brennan-Benavides, Blk. 378, Hale Subd. Set surf. csg. 65 ft.; W.O.C.

Texas Co. No. 1-A Benavides, C Lot 310, Hale Subd. Drlg. 200 ft.

Charco Redondo—Zapata County

W. C. Bob No. 2 Martinez, S¼, Blk. 22, Qandudo Grant. M.I.M.

Cuellar—Zapata County

Howard & Duggan No. 1 Cuellar Bros., Sur. 248. R.U.

Escobas—Zapata County

Sam Evans No. 1 Garza, Blk. 19, Zorro ranch. R.U.

G. E. Glasco No. 4-M Garzo, W½, 40-ac. tr., Covintas Gr. (workover). O.T.D. 1,348 ft. to D.D.

H.&R. Oil Co. No. 4-A Garza, Blk. 11,

Douglas Subd. Sd. 1,230-40 ft.; set csg.; W.O.C.

H. & R. Oil Co. No. 9 Garza, Blk. 11, Douglas Subd. Spudded.

B. W. Roscoe No. 6 Garza, Sh. 33, Fansler Part. Drlg. 521 ft.

B. W. Roscoe No. 6 Garza, Sh. 33, Fansler Part. Drlg. 721 ft.

Haynes—Zapata County

J. D. Long No. 1 Phelps, Villa Gr. R.U.

Magnolia Pet. Co. No. 4 Haynes, Blk. 7, Haynes Subd. Spudded in.

Magnolia Pet. Co. No. 5 Haynes, Blk. 7, Haynes Subd. Drlg. 1,482 ft.

Magnolia Pet. Co. No. 7 Haynes, Blk. 7, Haynes Subd. Set csg. 1,071 ft.; W.O.C.

McKay & Upchurch No. 15 Haynes, Blk. 7, Haynes Subd. Cg. 913 ft.

United Prod. Co. No. 10 Haynes, Blk. 13, Gunby Subd. Loc.

United Prod. Co. No. 13 Haynes, Blk. 13, Gunby Subd. Tstg. 1,030 ft.

United Prod. Co. No. 14 Haynes, Blk. 13, Haynes Subd. W.O. pmp. 997 ft.

United Prod. Co. No. 15 Haynes, Blk. 13, Haynes Subd. Tstg. 1,019 ft.

Valley Osage Oil Co. No. 3 Haynes, Blk. 14, Haynes Subd. W.O.C. 1,089 ft.

E. C. TEXAS WILDCATS

Anderson County

Tom Honter No. 1 G. E. Gauge, Blackfoot area, B. Gilbert Sur., 660 ft. out SE cor. of tr. and sur. Drk.

Angelina County

Hicks et al No. 1 Morris, J. Morris Sur., 3 mi. E of Diboll, S.D. 1,584 ft.

W. A. Stone et al No. 1 Southern Pine Lbr. Co., B. J. Thompson Sur., 8 mi. SE Lufkin. Drlg. sh. 1,950 ft.

Summeral-Harris et al No. 1 M. L. Condrea, D. D. Maroney Sur., ¾ mi. W of Huntington, approx. E/O to Ginter No. 1 Martin Wagon Works, on 10-ac. tr. Began Dec. 15; 10-in. at 22 ft.; drlg. sh. 825 ft.

Cherokee County

A. F. Richardson No. 1 F. P. O'Brien, G. S. Clapp Sur., 3 mi. NW of Rusk; 5,000-ft. test. Loc.

Dallas County

Mauldin Oil Co. No. 1 W. E. Howell, S. Layton Sur., 8 mi. E of Grapevine, 6 mi. W of Longmire, 1,000 ft. S line and 690 ft. W line of sur., on 107-ac. tr. R.U.

Falls County

A. H. Bell et al No. 1 C. L. Trice, F. Mayham Sur., 1 mi. E of Lott. M.I.R.

R. M. Hefflin, No. 1 T. E. Battle, Marl Sur., 3 mi. SW of Marlin. S.D. 2,082 ft.

Thirteen Oil Co. No. 1 H. R. Roberts, N. Slatter Sur., 6 mi. SE of Lott, Pecan Gap 1,480 ft.; drlg. 1,726 ft.

Fannin County

Joiner & Owens No. 1 Goss-Morgan, J. Stephens Sur., 16 mi. N of Honey Grove Top Austin 1,480 ft.; drlg. L. and chert 2,340 ft.

Styles & Smith No. 1 R. Stewman, J. W. Clark Sur., 2 mi. SE of Trenton. S.D. 588 ft.; elev. 724 ft.

Freestone County

Everett Drlg. Co. No. 1 O. W. Killian, E. J. Robins Sur., 6½ mi. SE of Fairfield. T.D. 3,00 ft.; sh.; S.D.

Wheelock & Collins No. 1 W. R. Boyd, F. B. Cabler Sur., 4 mi. SW of Fairfield. Pecan Gap ch. 2,744-2,818 ft.; base of Pecan 2,835 ft.; drlg. sh. and chert 3,-637 ft.

Yancey et al No. 1 Scott, Church Lot, H. Awalt Sur., W of Stewartsville. S.D. 3,860 ft.

Hunt County

Penn Oil Corp. et al No. 1 A. B. Manning, 5 mi. NE of Lone Oak, S. Owens Sur. Drk.

Superior Oil Co. No. 1 P. D. Paul, Mary Latham Sur., 4½ mi. NE of Quinlan. Drk. and R.U.

Lamar County

Lowery-Cutler No. 1 E. C. Porter, Thos. King Sur. Top Georgetown 354 ft.; T.D. 1,050 ft.; S.D.

Leon County

J. B. Daniels et al No. 1 Carter. Top sd. 1,292 ft.; swbd. 1½ bbls. oil and 150 bbls. wtr.; comp.

Roth & Faurot No. 1 J. L. Shaw, O. R. Reams Sur., 5 mi. N of Centerville. T.D. 6,132 ft.; hd. sh. and sd.; S.D.

Limestone County

A. W. Phillips et al No. 1 E. M. Speight, M. Herrin Sur., 6½ mi. SE of Mexia. Drlg. 2,160 ft.

Nacogdoches County

L. C. Bonhan et al No. 1 Angelina Lbr. Co., in J. Gomez Sur., 14 mi. SE of Nacogdoches. Fsg. 5,935 ft.

Rains County

Humble and Tide Water Oil Co. No. 1 Easter, R. Hotchiss Sur., 5 mi. NW Alba. Drlg. hd. L. 6,830 ft.

Red River County

Abercrombie and Harrison No. 3 Southern Pine Lbr. Co., D. D. Bruton Sur., 10 mi. NE of Clarksville. Junk in hole; 900-ft. csg. collapsed; T.D. 2,311 ft.

Carpenter Oil Co. No. 1 R. E. Anderson, S. W. Sims Sur., 3 mi. N of Clarksville. S.D. 1,834 ft.

Roy I. Carter Drlg. Co. No. 1 J. A. Tutt, C 40-ac. tr. in D. Hart Sur., 2 mi. S of Avery. S.D. 80 ft.

M. Petroff et al No. 1 R. G. Morris, J. Guest Sur., 2 mi. W of Detroit. S.D. 20 ft.

Robertson County

J. E. Mills No. 1 T. Congelosi, C of 75-ac. tr. in G. A. Nixon Sur., 3½ mi. SW of Hearne. T.D. 2,250 ft.; S.D.

Rusk County

John W. Merritt No. 1 J. A. Stallings, T. Uzzell Sur., 2½ mi. S of East Texas field. S.D. 3,944 ft.

Ben C. Lamb No. 1 Leath, L. J. Dooley Sur., 2½ mi. E of Pirtle; old test deepening; C.O. 4,740 ft.

Wood County

G. W. Nix et al No. 1 E. A. Russell, J. Delap Sur., SW cor. of county. S.D. 600 ft.

EAST TEXAS
(Border Counties)

Cass County

American Liberty No. 5-A Baugus, J. H. Rives Sur., Lot 10. 7-in. cmtd. 6,005 ft.; T.D. 6,017 ft.; W.O.C.S.

American Lib. No. 6-A Baugus, J. H. Rives Sur., Lot 9. Loc.

American Liberty No. 2 Sheppard, Lot 11, J. H. Rives Sur. Comp.; flw. 17 B.P.H.; T.D. 5,991 ft.

American Liberty No. 1 White & Walker, 4½-ac. tr., J. H. Rives Sur. Drlg. 5,-578 ft.

American Liberty No. 4 J. Wiley, C E and W. line, 56-ac. tr., J. Davenport Sur. Loc.

American Liberty No. 5 J. Wiley, SW cor. lse., J. Davenport Sur. Drlg. 3,575 ft.

Bay Oil Co. No. 1 G. E. Parker, SE cor. Greenham Sur. Comp.; flw. 2 B.P.H.; T.D. 6,116 ft.; P.B. 6,050 ft.

Eastern Tex. Prod. Co. No. 1 Belote, H. Holbert Sur. Hole clean; drlg. 5,889 ft.

Gulf Prod. Co. No. 2 Dawson et al, NW cor. lse., J. H. Rives Sur. Comp.; flw. 20 B.P.H.; T.D. 6,006 ft.

Gulf Prod. Co. No. 3 Dawson, J. H. Rives Sur. Drk.

P. L. Hoffman et al No. 1 Davis, James Smith Sur., SE cor. 58-ac. tr. Drlg. 5,455 ft.

H. L. Hunt No. 1 I.N.&C.L. Shelton, SE cor. 202-ac. tr., J. Davenport Sur. T.D. 6,050 ft.; tstg.

W. F. Lacey No. 1 J. Lewis, NW cor. B. E. Echols 17.4-ac. lse., H. Holbert Sur. Drlg. 5,540 ft.

Magnolia Pet. Co. No. 1 Allday Est., P. Evans Sur., SE cor. 87-ac. tr. Drlg. 2,100 ft.

Magnolia Pet. Co. No. 2 Allday Est., P. Evans Sur. Loc.

Magnolia Pet. Co. No. 9 J. E. George, John Collom Sur. Drlg. 5,942 ft.

Magnolia Pet. Co. No. 5 L. Haywood, P. Evans Sur., 625 ft. NE of No. 4. R.U.

Magnolia Pet. Co. No. 6 L. Haywood, P. Evans Sur., 508 ft. NW of No. 1. Drlg. 300 ft.

Magnolia Pet. Co. No. 1 Lewis & Wilks, A. Archer Sur., SE cor. 20-ac. tr. Drlg. 800 ft.

Magnolia Pet. Co. No. 1 J. B. McLeod, Cass Co. Sch. Ld. Sur., NW cor. sur. Loc.

Magnolia No. 5 Meda Green, James Davenport Sur., 245-ac. lse. 7-in. cmtd. 6,-058 ft.; T.D. 6,075 ft.; W.O.C.S.

Magnolia No. 2 Noel Est., Wm. B. Hughes Sur., NE cor. Noel lse. 7-in. cmtd. 6,-046 ft.; T.D. 6,060 ft.; W.O.C.S.

Magnolia Pet. Co. No. 4 Noel Est., W. B. Hughes Sur. Loc.

Magnolia Pet. Co. No. 5 Rives, SE cor. John Collum Sur. T.D. 6,035 ft.; tstg.

Magnolia No. 10 Rives, NE cor. John Collum Sur. Comp.; flw. 744 B.P.D.; T.D. 6,045 ft.

Magnolia No. 11 Rives, John Collum Sur., 804 ft. SE of No. 6. 7-in. cmtd. 6,011 ft.; T.D. 6,063 ft.; W.O.C.S.

Magnolia Pet. Co. No. 1 H. F. Walker, Wilson Robinson Sur., SE cor. 102-ac. lse. Drlg. 3,875 ft.

Magnolia Pet. Co. No. 2 H. F. Walker, Wilson Robinson Sur., SE SE cor. 102-ac. lse. Drlg. 4,000 ft.

Magnolia Pet. Co. No. 3 H. F. Walker, Wilson Robinson Sur., NW cor. 102-ac. lse. Drlg. 3,100 ft.

Magnolia Pet. Co. No. 4 H. F. Walker, Wilson Robinson Sur., NE cor. 102 ac. lse. Drlg. 2,550 ft.

Magnolia Pet. Co. No. 5 H. F. Walker, Wilson Robinson Sur., SW cor. 102-ac. lse. Drlg. 511 ft.

Magnolia No. 1 Thornton Hrs., Wilson Robinson Sur., NE cor. 30-ac. tr. 7-in cmtd. 6,046 ft.; T.D. 6,065 ft.; W.O.C.S.

R. W. Norton No. 4 J. T. Moore, Wm. R. Myers Sur. Drlg. 3,995 ft.

Ohio Oil Co. No. 7 R. P. Willis, S.F.I.W. Sur. No. 1,263. Loc.

Ohio Oil Co. No. 9 R. P. Willis, S.F.I.W. Sur. No. 1,263, SW of No. 3. Drlg. 5,-300 ft.

Ohio Oil Co. No. 12 R. P. Willis, SE cor. 320-ac. tr., S.F.I.W. Sur. 1,263. Rng. 7-in.; T.D. 5,924 ft.

Ohio Oil Co. No. 18 R. P. Willis, S.F.I.W. Sur. No. 1,263, 1,750 ft. W of No. 12. Drlg. 1,050 ft.

Phillips Pet. Co. No. 1 Chew, SE cor. 207-ac. lse., Robt. Trammel Sur. Drlg. 4,-561 ft.

Phillips Pet Co. No. 2 Chew, 1,460 ft. N. 326 ft. W. SE cor. W. D. Chew 207-ac. lse., Robt. Trammel Sur. Drlg. 6,067 ft.

Phillips Pet. Co. No. 3 Chew, 2,324 ft. N. 326 ft. W. SE cor. W. D. Chew 207-ac. lse., Robt. Trammel Sur. 7-in. cmtd. 5,-972 ft.; T.D. 5,979 ft.

Phillips Pet. Co. No. 2 Farrier, on 200-ac. tr., Wm. Myers Sur. Drlg. 6,015 ft.

Phillips Pet. Co. No. 5 Farrier, Wm. R. Myers Sur. Loc.

Phillips Pet. Co. No. 6 Farrier, Wm. R. Myers Sur. Drk.

Phillips Pet. Co. No. 7 Farrier, Wm. R. Myers Sur. Drk.

Phillips No. 3 Farrier, Wm. R. Myers Sur., Sur., 220-ac. lse. Drlg. 2,200 ft.

Phillips No. 4 Farrier, Wm. R. Myers Sur., 933 ft. W of No. 2. Drlg. 5,010 ft.

Phillips Pet. Co. No. 1 Skinner, Hutchinson tr., S.F.I.W. Sur. No. 1,025. Drlg. 2,010 ft.

Phillips Pet. Co. No. 2 Skinner, Hutchinson tr., S.F.I.W. Sur. No. 1,025. Rng. 7-in.; T.D. 6,125 ft.

Phillips Pet. Co. No. 3 Skinner, 160-ac. tr., S.F.I.W. Sur. No. 1,025. Comp.; flw. 510 B.P.D.; T.D. 6,001 ft.

Phillips Pet. Co. No. 1 M. Wasson, W. R. Myers Sur., 27-ac. tr. Comp.; flw. 577 B.P.D.; T.D. 6,102 ft.

Spray Oil Co. No. 2 Scott Adams, 25-ac. tr., Robt. Trammel Sur. Drlg. 3,720 ft.

Texas Co. No. 2 W. M. Hall, Alex Archer Sur., 664 ft. W of E line. 7-in. cmtd. 6,037 ft.; T.D. 6,070 ft.; W.O.C.S.

Texas Co. No. 3 W. M. Hall, Alex Archer Sur. Drlg. 500 ft.

Texas Co. No. 4 W. M. Hall, Alex Archer Sur. Drlg. 4,100 ft.

Texas Co. No. 2 J. B. McLeod, W. A. Elliott Sur., 440 ft. E of W and 495 ft. S of N line of 160-ac. tr. 7-in. cmtd. 6,068 ft.; T.D. 6,088 ft.; W.O.C.S.

Texas Co. No. 3 J. B. McLeod, W. A. Elliott Sur. Drlg. 3,050 ft.

Texas Co. No. 1 N. A. Rambo, C. C. Sch. Ld. Sur., SW cor. 160-ac. lse. 7-in. cmtd. 6,047 ft.; T.D. 6,079 ft.; W.O.C.S.

Tide Water No. 1 W. D. Chew, Robt. Trammel Sur., 150 ft. N of S line, midway between E and W lines of 20-ac. lease. Derrick.

Tide Water No. 3 C. C. Chew, NW cor. 55-ac. tr., Robt. Trammel Sur. 7-in. cmtd. 5,988 ft.; T.D. 6,010 ft.; W.O.C.S.

United Prod. Co. No. 2 G. W. Bibby Unit, Alex Archer Sur., Hartzo 20-ac. lse. Drlg. 5,421 ft.

United Prod. Co. No. 3 G. W. Bibby Unit, Alex Archer Sur., 13-ac. Hartzo lse. Cg. 6,035 ft.

United Prod. Co. No. 4 G. W. Bibby Unit, Alex Archer Sur., 24-ac. tr. Rg. 6,050 ft.

United Prod. Co. No. 2 Bivens Unit, Jas. Davenport Sur. Drlg. 5,421 ft.

United Prod. Co. No. 9 J. R. Jones Unit, Ben J. Murray Sur. Drlg. 5,749 ft.

United Prod. Co. No. 10 J. R. Jones Unit, Ben J. Murray Sur. Cg. 6,030 ft.

United Prod. Co. No. 7 Rambo Unit, Jas. Davenport Sur., H. A. Thomas 83-ac. tr. 7-in. cmtd. 5,993 ft.; T.D. 6,010 ft.; W.O.C.S.

United Prod. Co. No. 8 Rambo Unit, Jas. Davenport Sur., H. A. Thomas 83-ac. tr. Drlg. 5,790 ft.

United Prod. No. 9 Rambo Unit, J. Davenport Sur., 545 ft. S, 400 ft. E of most northerly NW cor. Rambo Unit. Loc.

United Prod. Co. No. 10 Rambo, J. Davenport Sur. Loc.

United Prod. Co. No. 9 J. T. Stewart Unit, John Collom Sur., 81-ac. tr. Cg. 4,800 ft.

United Prod. Co. No. 10 J. T. Stewart Unit, John Collom Sur., 48-ac. tr. Drlg. 5,001 ft.

United Prod. Co. No. 3 Tyson Unit, J. H. Rives Sur. Cmtd. off gas; T.D. 6,158 ft.; tstg.

United Prod. Co. No. 4-A Tyson Unit, J. H. Rives Sur. Drlg. 5,522 ft.

Harrison County

Geyer Oil Co. No. 1 Alex Moore, 5 mi. SW of Waskom, C. W. Fields Sur. T.D. 510 ft.; S.D.

H. H. Roberts et al No. 1 Z. Douglas, S. Fields Sur. T.D. 1,000 ft.; S.D.

Marion County

Arkansas-La. No. 1 W. S. Ford, Charles Grayson Sur., NE cor. Ford 204-ac. tr. Drlg. wtr. well.

Tom Bell et al No. 1 David Lane, SW C Log 2, Jones Sur. T.D. 72 ft.; S.D.

Sam Lanier No. 1 Lucey Rives, SE cor. M. G. Wall Sur. T.D. 960 ft.; W.O.S.R.

Morefield & Prince No. 1 Benefield, NE cor. Robt. Potter Sur., 4 mi. W of Oil City, La. T.D. 180 ft.; S.D.

Holcomb & Thomason No. 1 Lizzie Henderson, 330 ft. S and E, cor. Blk. 18, of Lizzie Henderson Subd., or 2,800 ft. S 3,450 ft. E of NW cor. of R. Bennington Sur. Drlg. 5,768 ft.

Panola County

Glassell & Glassell No. 1 Williamson, Marv Potts Sur. T.D. 5,666 ft.; csg. set; prep. to test.

Lawrel Pet. Co. No. 1 Bucknell, B. Anderson Sur. T.D. 5,980 ft.; S.D.

Logansport P. L. Corp. No. 1 Rushing, M. Smith Sur. T.D. 2,774 ft.; S.D.

Magnolia Pet. Co. No. 1 E. A. Hull, T. Applewhite Sur. T.D. 5,960 ft.; tstd. 2,-300,000 ft.; shut in.

Matex Oil Co. No. 1 Thomas M. Alstone, 3 mi. E of Elysian field. T.D. 5,036 ft.; prep. to test.

Shelby County

Mulroy-Curtain et al No. 1 Hayden, D. G. Yardt Sur. Drlg. 4,100 ft.

Potter & Rubeling O. H. Polly No. 1, Wm. Wisner Sur. T.D. 4,070 ft.; S.D.

Wm. Redditt No. 1 Pickering Lbr. Co., SE cor. Stephens English Sur. Spudding.

Red Wing Oil Co. No. 1 C. H. Herton, 54-ac. tr. in J. Dowlin Sur. S.D. 1,889 ft.

H. A. Stebbinger No. 1 Pickering Lbr. Co., on 160-ac. tr. in A. Hanson Sur. Drk.

NORTH TEXAS WILDCATS

Archer County

L. T. Burns No. 1 White, sec. 34, A.T.N C.L. Sur. Loc.

L. T. Burns No. 1 J. S. Bridwell, sec. 1,866, T.E.&L. Sur. S.S.O. 820-30 ft.; testing.

L. T. Burns No. 1 Perkins D, sec. 10, A.T.N.C.L. Sur. Spudding.

Clark & Mayfield No. 1 Miller, sec. 19, A.T.N.C.L. Sur. Spudding.

Hampton & Jones No. 1 L. H. Farmer, W. C. Winters Sur. A-663. Drlg. 1,480 ft.

L. Hedrick No. 1 Morgan, Blk. 67, J.C.S.L. Sur. A-240, Spudding.

Wilson & Ligon No. 1 Pearston, sec. 123, Harris Sur. Drlg. 600 ft.

Baylor County

Consolidated Oil Co. No. 3 Portwood Y, sec. 3,138, T.E.&L. Sur. Drlg. 1,450 ft.

S. P. Morris et al No. 1-B C. T. Porter E. Brown Sur. A-20. C.O.; T.D. 1,614 ft.

Collin County

California Consld. Oil Co. No. 1 Fagg, Jas. Rutherford Sur. Sd. 2,700-71 ft.; test wtr.; P.B. to 2,667 ft.

Port Bolivar O. & R. Co. No. 1 Durning, Wm. Creeger Sur. Sd. 3,940-44 ft.; tested wtr.; S.D.O.

Sorrell et al No. 1 D. R. Clark, J. Rowland Sur. Spudded and S.D.

Cooke County

Barbee No. 11 Norman, J. Bush Sur. A-107. Drlg. 1,900 ft.

Wm. D. Compton No. 1 P. Tucker, J. Barnett Sur. A-42. Drlg. 500 ft.

M. L. Harris No. 1 Williams, A. C. C. Bailey Sur. A-44. Tstg.: S.D.O. 2,175 ft.

B. H. Hilburn No. 1 W. A. Harris, J. Harris Sur. A-502. Fishing 1,440 ft.

Kingery et al No. 1 Davidson, C. Sagers Sur. A-938. Spudding.

A. A. Landers No. 1 Mann, J. O. Hill Sur. A-473. R.U.R.

C. Newburn No. 1 J. J. Clark, W. C. Campbell Sur. A-238. Drlg. 2,230 ft.

Peterson et al No. 1 J. M. Floyd, Chas. De Morse Sur. A-305. R.U.R.

Rapp O. & G. Co. No. 1 Mrs. M. J. Little, Blk. 60, Cooke Co. Sch. Ld. Sur. A-205. Drlg. 2,878 ft.

Ruble & Lowery No. 1 Dozier, Lot 12, F.C. S.L. Sur. R.U.R.

Seitz et al No. 1 State Bank, Charles Wheelock Sur. A-1,131. Drlg. 200 ft.

Sinclair Prairie Oil Co. et al No. 2 A. C. McCall, H. White Sur. A-1,134. Drlg. 8,020 ft.

Denton County

Carlysle & Wilson No. 1 J. P. Knox, R. Howard Sur. A-542. S.S.O. 1,540-41 ft.; testing.

J. C. Foster No. 1 Jeffcoat, J. West Sur. Drlg. 1,030 ft.

C. C. Minnick No. 1 C. N. Price, J. Doughtitt Sur. A-1,322. Fsg. 270 ft.

Oil Finance No. 1 J. S. Gambill. S.D.O. 1,380 ft.

J. Stogner No. 1 J. Maxwell, Jno. Morton Sur. A-792. Spudded and S.D.

Grayson County

F. Gailbreath et al No. 1 Singletary, Chas. Quillian Sur. A-989. Drlg. 2,800 ft.

Olson et al No. 1 D. R. Uitger, P. P. Cady Sur. A-301. Drlg. 2,020 ft.

Jack County

Bryson O. & G. Co. No. 1 O. Loving, T.& N.O. Sur. A-852. U.R. 6⅝-in. csg. 3,410 ft.

Danciger O. & R. Co. No. 1 Kinder, B.S.&F. Sur. A-83. Drlg. 500 ft.

Hamilton Pet. Co. No. 1 J. S. Rhodes, Wm. Orr Sur. A-849. Loc.

Hanlon-Buchanan, Inc., No. 1 Calvin, E. B. Calvin Sur. P.O.P. est 150 bbls.; 2,-869-89 ft. C.O. and testing.

Mrs. D. P. Jack No. 1 Hardy, T.E.&L. Sur. No. 2,555. Drk.

Sam Shabay No. 1 L. W. Fields, sec. 1, S.P.R.R. Sur. Loc.

Montague County

Clark-Beckner No. 1 C. W. Bell, sec. 6, M.E.P.&P. Sur. Drk.

Gutowsky & Clay No. 1 Lemon, C. K. Ham Sur. S.D. 2,200 ft.

W. E. Halbert No. 1 Petty, S. A. Southerland Sur. A-992. S.D.O. 1,680 ft.

Sinclair Prairie No. 1 Hodges, Blk. 55, K. C.S.L. Sur. Testing S.S.O. 1,733-50 ft.

Throckmorton County

Canyon O. & G. Co. No. 1 Wright, D.B.B. &C. Sur. S.D. 350 ft.

R. J. Williams No. 1 W. B. Parrott, T.E. &L. Sur., sec. 961. Drlg. 2,520 ft.

Wichita County

A. E. Blair No. 1 Cody Est., sec. 311, Waggoner Col. Subd. S.D.O. 1,895 ft.

Box & Seaberry No. 1 Krizan, Blk. 43, Cherokee Sch. Lds. Drlg. 710 ft.

T. B. Medders No. 1 Allen, H.T.&B. Sur. A-129. S.D.O. 1,300 ft.

W. B. Omohundro No. 1 Cunningham, Blk. 289, W.C.S. Sur. Loc.

Palmer et al No. 1 McCarty, S. O. Fowler Sur. No. A-78. Fsg. 1,820 ft.

Wilbarger County

Rathke Oil Co. No. 1 Waggoner, H.&T.C. Sur., Blk. 33. Drlg. 1,660 ft.

Wise County

Texas-Canadian Dev. Co. No. 1 Levette, sec. 1, S.C.S.L. Sur. Testing S.L. 3,216-20 ft.

Young County

R. C. Albright No. 1 W. E. Steele, I.R.R. Sur. A-156. Drk.

Alexander & Long No. 1 Goldston, S.P.R.R. Sur. A-263. Drlg. 2,610 ft.

Helmerich & Payne No. 1 J. H. Rubenkoenig, J. Poitevent Sur. 9-227. Drlg. 2,275 ft.

Nash & Windfohr No. 1 F. B. Lowery, S. H. Criswell Sur. A-1,297. P.B. to test S.S.O. 3,750-3,800 ft.

Pitzer & West No. 1 Gathright, T.E.&L. Sur. 617. Drlg. 2,600 ft.

States Oil Corp. No. 1 N. Laquay, A. Erwin Sur. A-1,779. Loc.
A. T. Strong No. 1 Davidson, R. C. Eddleman Sur. A-1,420. Drlg. 3,960 ft.
R. H. Vise No. 1 Dollins, T.E.&L. Sur. 615. Drlg. 2,000 ft.
C. V. Welch No. 1 Street, M. E. Criswell Sur. A-1,772. Drlg. 1,000 ft.
L. W. Wicker No. 1 McCluskey, Green Sur. Drlg. 2,200 ft.
Yorktex Pet. Co. No. 1 F. G. Burnett, G. W. Hills Sur. A-151. Drlg. 4,500 ft.

WEST TEXAS WILDCATS

Andrews County

American Liberty Oil Co. No. 1 Mayhew, sec. 23, Blk. A-51, P.S.L. Sur. M.I.M.
G. F. Getty, Inc. No. 1 R. H. Lindley, 660 ft. from S and W, sec. 8, Blk. A-46. Drlg. 3,125 ft.
Grisham Hunter Corp. No. 1 Ratliff & Bedford. Fsg. 4,494 ft.
Wm. Hannigan No. 1 Logsden, sec. 5, Blk. A-32. Drlg. 4,000 ft.
R. H. Henderson No. 1 J. E. Parker, sec. 25, P.S.L. Sur. A-43. T.D. 4,555 ft.; C.O.
Sinclair Prairie Oil Co. No. 1 E. Cowden, sec. 12, Blk. 44, Twp. 2n, T.&P. Sur. Drlg. 4,150 ft.

Brewster County

F. C. Dodson No. 1 Texas American Synd., sec. 66, Blk. 10, G.H.&S.A. Sur. T.D. 3,690 ft.

Crane County

Clark et al No. 1 Jordan, sec. 12, Blk. B-22, P.S.L. Sur. Drlg. 2,200 ft.
Gulf Oil Corp. No. 2 W. N. Waddell, sec. 18, Blk. B-21. T.D. 6,709 ft.; P.B. 6,186 ft.; 9 bbls. oil in 8 hrs. and some water.
Gulf Oil Corp. No. 2 McKnight, sec. 9, Blk. B-21. T.D. 3,797 ft.; mudding.
Gulf Oil Corp. No. 2 Snodgrass, sec. 1, Blk. B-25. Drlg. 3,375 ft.; 1,800 ft. oil in hole.
Moore Bros. No. 1 Barnsley, sec. 43, Blk. 32, P.S.L. Sur. Drlg. 6,400 ft.
Navarro Oil Co. No. 1 Dawson, sec. 2, Blk. R, T.&M.R.R. Sur. Drlg. 2,241 ft.

Crockett County

T. P. Coal & Oil Co. No. 1 Bair, 660 ft. from S and E, sec. 51, Blk. 1, I.&G.N. Sur. M.I.M.

Culbertson County

Grisham & Hunter No. 1 fee, SE cor. sec. 22, Blk. 54, P.S.L. Sur. M.I.M.

Dawson County

Roy Albaugh et al No. 1 J. Robinson. T.D. 5,038 ft.; pumping 4½ bbls. oil per hour.

Ector County

Empire O. & R. Co. No. 1-D Cummins, sec. 23, Blk. 45, Twp. 1n, T.&P. Sur. T.D. 3,900 ft.; set csg.
Sinclair Prairie Oil Co. No. 2-A Johnson, sec. 48, Blk. 43, Twp. 1s, T.&P. Sur. Loc.
Stanolind O. & G. Co. No. 2-B Cowden. T.D. 4,451 ft.; P.B. 4,303 ft.; fsg.

Edwards County

Plateau Oil Co. No. 1 Hatch. Drlg. 4,700 ft.

Fisher County

L. A. Daniels et al No. 1 J. J. Nickless. S.D. 1,320 ft.
L. A. Long et al No. 1 J. L. Mayberry, sec. 56, Blk. 1, H.&T.B. Sur. T.D. 3,321 ft.; P.B. 3,042 ft.; S.D.
Southern Oil Co. No. 1 Robinson, sec. 172, Blk. 2, H.&T.C. Sur., 2½ mi. NE of Raton. R.U.S.T.

Gaines County

Amerada Pet. Corp. No. 1-A Averitt, sec. 228, Blk. G, W.T.R.R. Sur. T.D. 5,064 ft.; S.D.; W.O.C.
Amerada Pet. Corp. No. 1 Robbins, 660 ft. from N and W. sec. 9, Sur. A-22. Drlg. 4,210 ft.
Stanolind O. & G. Co. No. 1 Morrow. Coring 4,420 ft.

Glasscock County

Fleetborn Oil Co. No. 1 Black Arrow, sec. 3, Blk. 34, Twp. 3s, T.&P. Sur. T.D. 900 ft.; C.O.
Fleetborn Oil Co. No. 1 Coulson, sec. 19, Blk. 33, Twp. 3s, T.&P. Sur. Drlg. 2,452 ft.
Moore Bros. No. 1 I.T.I.O. and McDowell, sec. 31, Blk. 34, Twp. 5s, T.&P. Sur. Drlg. 2,211 ft.

Hockley County

Texas Co. No. 1 B. Slaughter, Labour 83, League 38, Zavala Co. Sch. Lds. T.D. 3,750 ft.; drlg. by tools.

Howard County

Johnson No. 2 Hyman, sec. 88, Blk. 29, W.&N.W. Sur. R.U. machine.

Hudspeth County

Haymon Krupp Oil & Ld Co. No. 1 Thaxton, SE¼ sec. 34, Blk. 74, Twp. 6. Fsg. 2,178 ft.

Jeff Davis County

Joiner & Wilcox No. 1 Jones & Coffield, sec. 121, Blk. 4, H.&T.C. Sur. S.D. 500 ft.

Jones County

H. D. Egger et al No. 1 O. Roberts, sec. 26, Orphan Asylum Lands. Drlg. 153 ft.
K. O. T. Oil Co. No. 1 E. C. Duke, sec. 20, Blk. 15, T.&P. Sur., 1 mi. N of Hawley field. Fsg. 1,910 ft.
Oyster & Griffith No. 1 Bumpass, A. Jones Sur., 3 mi. SW of Truby. Fsg. 1,800 ft.
J. L. Reeves No. 1 Kelly, C. Martinez Sur., 1½ mi. N of Hawley. S.D. 1,835 ft.
Texas Inland Oil Co. No. 1 J. K. Pittard, sec. 27, Orphan Asylum Lds. Drlg. 1,841 ft.
Tiner et al No. 1 Rainwater, sec. 34, Blk. 2, S.P. Sur. Fsg. 2,275 ft.
Ungren & Frazier No. 1 Davis & Stemmons, Lot 7, F. M. Smith Sur. No. 3, 2½ mi. SW of Lueders. Drlg. 2,036 ft.
Ungren & Frazier No. 1 Trothers, Lot 1, Sub. 2, E. C. Miller Sur. T.D. 1,708 ft.; U.R. csg.

Nolan County

Dr. Robinson Co. No. 1 E. Gabler, sec. 26, Blk. X, T.&P. Sur. S.D. 2,118 ft.

Pecos County

Bahan & Rhodes No. 1-B Bonebrake, sec. 116, Blk. 8, H.&G.N. Sur. T.D. 2,260 ft.
C. A. Everts No. 1 W. S. Tyrell, sec. 508, G. Montez & Duran Sur. Fsg. 2,035 ft.
Hightower Oil Corp. No. 1 Holmes, sec. 6, Blk. C-3, E.L.R.R. Sur. Drlg. 1,976 ft.
Humble O. & R. Co. No. 1 E. M. Gray, sec. 94, Blk. 11, G.H.&S.A. Sur.; 5,000-ft. test, M.I.M.
Kirk et al No. 1 Potts, sec. 6, Blk. 9, H.& G.N. Sur. T.D. 1,774 ft.; testing.
Lee Pet. Corp. et al No. 1 J. L. Nutt, sec. 1, W. D. Henley Sur. Drlg. 111 ft.
E. R. Minshall, No. 1 Banker, sec. 25, Blk. 146, T.&St.L. Sur. S.D. 2,815 ft.
S. Thompson No. 1 Elsinore Cattle Co., sec. 54, Blk. D, G.C.&S.F. Sur. T.D. 3,939 ft.; U.R. csg.
Young No. 1 Bailey, sec. 23, Blk. 178, T.C. R.R. Sur. T.D. 1,385 ft.; U.R. csg.

Presidio County

L. C. Brite No. 4 fee, C NW¼ sec. 113, Blk. 12, G.H.&S.A. Sur. M.I.M.
Lindeman Bros. Oil Corp. No. 1 J. R. Bledsoe & Badgley, sec. 15, Blk. 351, G.C.&S.F. R.R Co. Sur., 2½ mi. NE of Presidio. Drlg. 3,208 ft.
A. H. Main No. 1 Greenlee, sec. 40, Blk. 347, 13 mi. NE of Marfa. M.I.M.

Reagan County

Bahan & Rhodes No. 1 Kloh, sec. 37, Blk. 37, Twp. 5s, T. & P. Sur., NW cor. of county. T.D. 350 ft.; set csg.

Schleicher County

Mangus Oil Co. No. 1 Judkins & Spencer, C SW¼ sec. 4, W. W. Russell, grantee. Elev. 2,209 ft.; T.D. 6,527 ft.; P.D. 5,912 ft.; to C.O.

Terrell County

Ohio Oil Co. No. 1 M. H. Goode, sec. 26, Blk. 161, G.C.&S.F. Sur. Drlg. 7,449 ft.
J. T. Stockwell et al No. 1 Bates-Felps, sec. 5, Blk. A-4, G. W. Turley Sur., 17 miles SE of Yates field. To deepen from 5,605 ft. to 6,500 ft.

Terry County

W. L. Pickens et al No. 1 Lewright, sec. 1, Blk. C-37, P.S.L. Sur. T.D. 321 ft.; W.O.C.
Uscan Oil Co. No. 1 Brownfield, C N¼ sec. 54, Blk. K, P.S.L. Sur. S.D. 5,504 ft.

Tom Green County

Webb Bros. No. 1 J. F. Schrivener, Krending Sur. 1,663, 3 mi. N and E of Van Court. S.D. 664 ft.

Upton County

R. H. Henderson No. 1 Reese, sec. 16, Blk. 3½, C.C.S.D.&R.G.N.G. Sur. S.D. 2,617 ft.
Moore Bros. No. 1 Giddings, Sub. 25, Throckmorton Co. Sch. Lds. Drlg. 3,600 ft.
J. H. Myles & Son No. 1 Hughes, sec. 91, Blk. Y, G.C.&S.F. Sur. S.D. 380 ft.
Dan Short No. 1 Webb, sec. 174, Blk. E, C.C.S.D.&R.G.N.G. Sur. Drlg. on iron 815 ft.

Ward County

Bentley & Massey No. 1 Boogher, Cellar.
Findley & Cherry No. 1 Sealey, sec. 54, Blk. F, G.M.M.B.&A. Sur. T.D. 3,209 ft.; W.O.C.; ran liner.

Winkler County

Adams & Bradley No. 1 Edwards, sec. 6, Blk. C-23. Drlg. 1,112 ft.
Read & Duffey No. 1 Sealey, sec. 8, Blk. A, G.M.M.B.&A. Sur. Drlg. 4,376 ft.
Richardson Oils, Inc., No. 1 Humble-Walton, sec. 3, Blk. B-3, P.S.L. Sur. Drlg. 1,022 ft.
Sun Oil Co. No. 1 Edwards, sec. 6, Blk. C-23, P.S.L. Sur. R.U. rotary.

Yoakum County

Texas Pacific Coal & Oil Co. No. 1 Bennett, sec. 678, John H. Gibson Sur. T.D. 4,645 ft.; drlg. plug.

RANGER (WEST CENTRAL TEXAS) DISTRICT

Callahan County

H. V. House et al No. 1 R. Smart "B," 5 mi. SW of Admiral, W. T. Lassiter Sur. Spd. and S.D.
Hal Hughes No. 2 Williams, 7 mi. NE Baird, C SE¼ SE sec. 61, B.O.A. Sur. 2,500-ft. test. Drlg. 500 ft.
Mesa Verde Oil Co. No. 1 Klepper, 3 mi. N Clyde, 555 ft. from E and 150 ft. from S of farm in sec. 69, B.B.B.&C. Sur. Loc.
F. R. Midkiff No. 1 Hunt, NE cor. county, sec. 107, University School Lands. Loc.

Coleman County

Anzac Oil Corp. et al No. 1-H Morris, 12 mi. NE Coleman, 3,700 ft. from S, 9,770 ft. from W of J. Harris Sur. No. 77. Loc.
Midfield Oil Co. No. 1 T. H. Ward, sec. 274, W. Echels Sur. Drlg. 1,100 ft.

Comanche County

H. L. Baughman No. 1 Hardin, Isa Hoxey Sur. S.D. 800 ft.

Eastland County

Ashburn and Luke No. 1 Scott, A. Tarter Sur. T.D. 3,118 ft.; shot with 100 qts.; tstg.
F. J. Estes No. 1 Gentry, A. Popejoy Sur. Drlg. 2,485 ft.
Ray Hoff No. 1 Brashears, 5½ mi. SE Eastland, Blk. 39, McLennan Co. S. L. Leagues 3 and 4. Drlg. 385 ft.

Hamilton County

Seaboard Oil Co. No. 1 fee, A. C. Grimes Sur. 10 mi. N of Huntington. Drlg. 3,470 ft.
Walter Gant No. 1 Drake, 5 mi. S Hamilton, 4,100 ft. from S and 2,700 ft. from W of A. Kuykendall Sur. Fishing bit 3,600 ft.

Palo Pinto County

Palo Pinto O. & G. Corp. No. 1 Zimicki N edge Strawn, 6,020 ft. from S, 4,520 ft. from W of Henry Bird Sur. Loc.

Shackelford County

H. C. Akins et al No. 1 J. E. Swenson, C E½ sec. 14, A.B.&M. Sur. Loc.
Humble O. & R. Co. No. 1 W. P. Newell, 5 mi. W Albany, sec. 2, G.H.&H. Sur. Drlg. 550 ft.
Jones & Stasney et al No. 1 Dawson & Conway, 2 mi. N Morris-Buie pool, C SW SE¼ sec. 195, E.T.R.R. Sur. S.D. 1,225 ft.
Owen-Snebold Oil Corp. No. 1 Ivey, NW cor. county, sec. 159, B.B.B.&C. Sur. Spdg.
Roberts, Calhoun & Boynton No. 1 W. H. Green, 12 mi. SW of Albany, sec. 65, T. &P. Sur., Blk. 12. Drlg. 575 ft.
Ungren & Frazier et al No. 1 Snyder, 3 mi. SW Sedwick, 405 ft. from S, 330 ft. from W of sec. 26, L.A.L. Sur. Loc. for Ellenburger test.

Stephens County

C. B. Christie et al No. 1 E. S. Maury, 4 mi. W of Crystal Falls, J. Koehler Sur., Abst. 26. S.D. 650 ft.
W. T. Garret et al No. 1 Echols, 6 mi. SE of Ivan, W½, sec. 10, Blk. 3, S.P.R. R. Sur. Drlg. 1,225 ft.
Mudge Oil Co. No. 1 W. P. Smith, 2 mi. NW of Ivan, sec. 14, S.P.R.R. Sur., Blk. 2. Drlg. 1,820 ft.

Tarrant County

E. E. Hoffpauir et al No. 2 W. H. Davis, 2 mi. S Arlington, H. Blackwell Sur., Pat. 3-1,197. Spd. and S.D.

Throckmorton County

R. J. Williams et al No. 1 W. B. Parrott, 4 mi. NW of Woodson, sec. 961, T.E.&L. Sur. Drlg. 2,460 ft.

Wise County

Texas-Canadian Dev. Co. No. 1 Leverett, Blk. 19, Smith Co. Sch. Lds. Sur., 5 mi. NE of Rhome, 3,500-ft. test. Drlg. 2,650 ft.

Panhandle Completions

Carson County

Gulf Oil Corp. No. 16 Cooper, 2,960-3,069 feet, shot, 639 bbls. on pump. Magnolia Petroleum Co. No. 18 fee, 3,022-55 feet, shot, 642 bbls. on pump.

Gray County

Cosmos Oil Co. No. 2 Catlin, 3,135-3,218 feet, shot, 985 bbls. on pump. Dolomite Oil Co. No. 2 Sailor, 3,110-3,255 feet, shot, 688 bbls. on pump. Kewanee Oil & Gas Co. No. 9 Morgan, 3,155-3,268 feet, shot, 683 bbls. on pump. Stanolind Oil & Gas Co. No. 5 Holmes, 3,175-3,542 feet, plugged back to 3,200 feet, 37 bbls. on pump.

Hutchinson County

Danube Oil Co. No. 1 Starnes, 3,120-80 feet, shot, 837 bbls. on pump. Drilling & Exploration Co. No. 8 Watkins, 2,904-90 feet, shot, 610 bbls. on pump.

Wheeler County

Smith Brothers No. 7 Johnson, 2,485-2,550 feet, 540 bbls. on pump.

East Texas Completions

Gregg County

J. C. Burnett No. 1-B State, 3,576-93 feet, 32 bbls. per hour. Humble Oil & Refining Co. No. 27 Harris, 3,504-69 feet, 20 bbls. in 23 minutes; No. 16 Hughes, 3,605-36 feet, 21 bbls. in 18 minutes. Lechner and Hubbard No. 2 Jones, 3,570-3,604 feet, 25 bbls. in 15 minutes. Miller and Lacy Oil Co. No. 4 Nicholson, 3,663-77 feet, 50 bbls. per hour. C. O. Starnes No. 1 Walker, dry 3,602 feet. Stroube and Stroube No. 6 Bumpass, 3,455-94 feet, 50 bbls. in 45 minutes. Sun Oil Co. No. 13-B Tooke, 3,537-99 feet, 18 bbls. in 15 minutes; No. 45 Cole, 3,514-38 feet, 44 bbls. per hour. Felsenthal No. 2 Choice, 3,741-43 feet, 15 bbls. per hour on pump. H. & F. Corp. No. 6 Crews, 3,733-34 feet, 14 bbls. in 15 minutes. C. V. Lansberry, Receiver No. 16 Money, 3,586-89 feet, 79 bbls. per hour. Sinclair Prairie Oil Co. No. 26 Lauther, temporarily abandoned 3,625 feet. Southwest Corp. No. 2 Jones, 3,647-48 feet, 20 bbls. in 15 minutes. Texola and others No. 1 Benson, dry and abandoned 3,685 feet.

Rusk County

Gulf Oil Corp. No. 34-C Christian, 3,704-16 feet, 90 bbls. per hour; No. 5 Cole, 3,793-99 feet, 40 bbls. per hour. Magnolia Petroleum Co. No. 9 Jarnigan, 3,651-70 feet, 20 bbls. in 15 minutes. H. Hanbury No. 2 Van Zandt, 3,670 feet, plugged back to 3,643 feet, 70 bbls. oil and 20 bbls. water in 21 hours. P. C. H. Oil Co. No. 2 Green, 3,827-28 feet, 150 bbls. in two hours.

Upshur County

Humble Oil & Refining Co. No. 30 Holland, 3,611-35 feet, 20 bbls. in 20 minutes. Perrin and Fell No. 8 Landers, 3,725-26 feet, 45 bbls. per hour. Texas Co. No. 7 Stinchcomb, 3,821-22 feet, 20 bbls. per hour.

Rocky Mountain Runs

Estimated daily average production for the week ending December 26:

WYOMING

	Bbls.
Salt Creek	16,390
Big Muddy	1,730
Badger Basin	40
Black Mountain	170
Byron	1,150
Dallas Derby	630
Dutton Creek	60
Elk Basin	460
Ferris	10
Frannie	1,850
Garland	2,230
Grass Creek	1,100
Hamilton dome	710
Hidden dome	450
Hudson	320
LaBarge	970
Lance Creek	8,810
Lost Soldier	1,250
Medicine Bow	2,660
Midway	30
Oregon Basin	2,210
Osage	770
Pilot Butte	20
Rock River	1,260
South Casper	550
Poison Spider	230
Simpson Ridge	10
Teapot	20
Waugh dome	120
Total Wyoming	46,210

MONTANA

Buckley Border	150
Cat Creek	660
Cut Bank	11,250
Dry Creek	160
Kevin-Sunburst	4,720
Lake Basin	40
Pondera	1,130
Total Montana	18,110

COLORADO

Florence	150
Fort Collins and Wellington	310
Iles dome	2,510
Moffat	480
Orchard	50
Rangely	80
Tow Creek	150
Total Colorado	3,710

NEW MEXICO

Artesia	670
Cooper	7,700
Eunice	27,800
Getty	60
Hobbs	23,940
Hogback	200
Jal	3,720
Lea	940
Maljamar	2,410
Monument	12,150
Rattlesnake	420
Table Mesa	40
Total New Mexico	80,040
Total Rocky Mountain region	148,070

PERSONAL

LEON E. SCHROEDER will begin his fourth year as secretary of the Petroleum Motor Transport Association January 1, having been unanimously re-elected at the recent annual meeting of the association in Tulsa. He is a member of the motor transport department of Mid-Continent Petroleum Corporation, under R. F. FIKE, superintendent, and has been connected with the Mid-Continent company for nine years. Before entering the oil business he was associated with the Kresge stores. He is a native of Galesburg, Ill., and attended the high school of that city and Lombard College. His home is in Tulsa.

SHELBY E. KIDD, of New Orleans, La., has been elected a director of the Standard Oil Company of Louisiana to succeed J. V. GRESHAM, deceased. He will retain his position as secretary and assistant treasurer of the company.

JARRETT S. SMITH, district gas superintendent in charge of the Pledger, Tex., Natural Gas System, has been transferred and made superintendent of the Tomball, Tex., Natural Gas System.

DAVID B. McCONNELL, associated with the minerals division of Louisiana department of conservation for several years, has recently been placed in full charge of the northwest Louisiana district for the department.

W. T. DABBS, formerly tool pusher in the Sand Hills district, Ector County, Texas, for Humble Oil and Refining Company, has been promoted to district superintendent in charge of the Hurdle and Big Lake districts.

P. B. BADGER, foreign trade committee; L. A. BLUMENTHAL, foreign trade department; L. A. APPLEY, industrial relations department and C. T. CRAWFORD, foreign trade department, are among the Socony-Vacuum Oil Company, Inc., representatives who have been abroad recently on company business.

W. C. FISHER, president of Model Oils, Ltd. of Calgary, Alberta, and LEO SWEENEY, manager of the Maple Leaf refinery at Coutts, Alberta, visited Edmonton recently to complete filing on extensive acreage on the Sweet Grass arch which they are planning to develop.

E. N. KOTHE, manager of Socony-Vacuum Oil Company, Inc.'s eastern refineries, presided at the company's Twenty-Year Club sixteenth annual dinner held in New York recently. Mr. Kothe is president of the club. J. A. BROWN, president, was one of the speakers on the program.

ROSS S. CAMPBELL, former secretary and general counsel for the White Star Refining Company prior to his recent new venture into the refining business as president of the Interlakes Refining Company, has resigned the latter position to resume the practice of law in Detroit, Mich., as a member of the firm of Pear, Campbell, Langs & Tyler.

DR. GERALD L. HASSLER, assistant professor of petroleum engineering in the school of mineral industries at Pennsylvania State College for two years, has resigned to join the staff of Shell Development Laboratory at Berkeley, Calif. Doctor Hassler has become well known in the Pennsylvania district through his research and writings on various phases of production.

WILLIAM B. FLYNN will leave the land department of the Standard Oil Company of Kansas on December 31 to take a position with C. J.

RALPH B. ROARK, production manager for Shell Petroleum Corporation, has returned to Tulsa from a vacation and business trip to California.

DANA H. KELSEY, vice president, Sinclair Prairie Oil Company, Tulsa, and MRS. KELSEY spent Christmas in Midland, Tex., the guest of their son, JOHN KELSEY.

C. L. BULLOCK, former Ohio operator who went to Michigan when the Saginaw and Muskegon fields were opened about 10 years ago, is now operating with GEORGE TALBOT under the name of the American Drilling Company.

A. J. O'ROURKE, district manager of the West Texas-New Mexico land department of the Skelly Oil Company, has been transferred from Midland, Tex., to Wichita, Kans., where he becomes manager of the Kansas division. He succeeds DON A. HILL, who has been transferred to company headquarters at Tulsa and appointed assistant to A. L. CASHMAN, head of the land department.

J. C. GALLAGHER, of the Pyinma Development Company, Ltd., Chauk, Upper Burma, India, was a guest at the Wildcat Christmas Jinks of the California Oil and Gas Association, held December 18 in Los Angeles. Mr. Gallagher left Rangoon, Burma, October 17, crossed from London to New York on the "Queen Mary," and is now on the last lap of a globe-encircling trip which has enabled him to visit most of the principal oil fields of the United States.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Editor Jim Moroney of Okmulgee, Okla., writes: "Our great state of Oklahoma, where the sun-kissed meadows are pinned like blankets to the rocky landscape by myriads of blackened derricks, the mute harbingers of prosperity and activity."

L. Solinsky, general manager of the Avis Oil & Gas Company, dies suddenly in Wichita Falls, Tex.

Oklahoma and Kansas oil is posted at 50 cents per barrel but an increase is expected early in the new year.

20 YEARS AGO

Alfred C. Bedford, new head of the Standard Oil Company of New Jersey, began business life as a clerk in a dry goods store at the age of 18.

The New York Kindergarten Association was bequeathed $500,000 by the late John D. Archbold.

The Magnolia Petroleum Company buys all of the McMan Oil Company's oil and pipe line properties in Kansas and Oklahoma for a price reported to have been $36,000,000, part in cash, and part in Magnolia stock and notes payable between now and 1920.

10 YEARS AGO

In the last week of the year the average daily production of oil in the United States was 2,375,342 barrels and the motor vehicle registration 22,330,000.

The discovery lease in the Seminole field has produced 1,324,068 barrels of oil since July 16, 1926, or one-eighth of all the oil the pool has produced.

The United States will produce about 775,000,000 barrels of oil in 1926, thus breaking all records.

PAUL GUARIN, of the Shell Petroleum at Houston, Tex., was in Tulsa for the Christmas holidays.

FRANK R. CLARK, vice president and chief geologist of Ohio Oil Company, at Tulsa, and MRS. CLARK have returned from a wedding trip to Florida.

E. B. REESER, president of the Barnsdall Oil Company, Tulsa, is in New York, where he will spend several weeks at the eastern offices of the company.

SAM KORNFELD, geologist, returned from a tour of the oil fields of Illinois, Indiana, Ohio and Michigan in time to spend Christmas with relatives in Tulsa before returning to his home at Wichita, Kans.

EDUARDO CARLOS LAZO, Tampico, Mexico, of the Agencia E Inspeccion Technica de Petroleo of the government of Mexico, was in Tulsa in the past week. He has been studying American operating methods in the Mid-Continent field. His mission ended in Tulsa and Mr. Lazo left Saturday for his home country.

ARTHUR A. SEELIGSON, president, heads the board of directors of the new Transwestern Oil Company. The other directors elected are: MR. and MRS. CHARLES F. URSCHEL, principal stockholders; WESLEY GISH, vice president in charge of exploration; ORBA GREENWOOD, treasurer; GEORGE W. GRANT, general counsel and secretary; E. L. DE GOLYER, geologist and engineer and former chairman of the Amerada Petroleum Corporation, and J. W. HEWGLEY, vice president in charge of production. JAMES J. ELLIS, district superintendent of the Carter Oil Company, will join the new firm as assistant to Mr. Hewgley.

PARAGRAPHS

T. B. LAMBERT, petroleum engineer for Shell Petroleum Corporation, has been transferred from Shreveport, La., to that company's Iowa, La., office in southern Louisiana.

GEORGE WITTMER, III, Wittmer Oil Company, Pittsburgh, Pa., has been appointed chairman of the program committee for the spring meeting of the eastern district of the American Petroleum Institute's division of production May 6 and 7 at Columbus, Ohio. The appointment of committees for the spring production division meeting was made by J. C. ASKAM, chairman, who is connected with Ohio Oil Company, Findlay, Ohio. Serving with Mr. Wittmer on the program committee are J. J. SCHMIDT, East Ohio Gas Company, Cleveland, Ohio, and F. E. ECKERT, Hanley & Bird, Bradford, Pa. Arrangements for the meeting will be made by D. T. RING, Ohio Fuel Gas Company, Columbus, Ohio, and H. J. LOWE, Pure Oil Company, Newark, Ohio, is in charge of publicity. CHRISTY PAYNE, JR., Peoples Natural Gas Company, Pittsburgh, Pa., is in charge of registration. The membership committee is composed of H. D. ATHA, Gordon Oil Company, Mount Pleasant, Mich., chairman; GEORGE MEYERS, Sun Oil Company, Toledo, Ohio; E. H. TOLLEFSON, Hope Construction & Refining Company, Clarksburg, W. Va.; C. D. HUNTER, Kentucky-West Virginia Gas Company, Ashland, Ky., and JOHN A. THOMPSON, Belmont-Quadrangle Drilling Company, Bradford, Pa.

G. H. McCANN, who joined the Abadan, Iran, engineering staff of Anglo-Iranian Oil Company in 1910, has retired. Mr. McCann worked his way through various steps of engineering service at Abadan until 1930 when he became chief engineer in Iran.

T. BICKFORD, H. G. BOYLE, F. W. HALES, D. H. G. R. LAMB, J. SELFE, G. A. RAE, A. T. JEFFREY, W. T. IRVINE, E. S. EWART, W. DRYSDALE, C. B. DEAN, A. F. LONGBOTTOM, E. M. OLIVER, D. A. B. AUGUST, E. S. WATSON, K. C. ACKROYD, P. TIBBOTT, J. L. SPIERS, R. M. S. OWEN, J. F. MAY and A. D. KINGSFORD have been appointed to Anglo-Iranian Oil Company, Ltd.'s field operations staff in Iran. The following have been assigned to duties at Anglo-Iranian's refining center at Abadan: J. E. WELHAM, R. S. RADFORD, J. W. IRVING, I. S. KING, K. J. MACKLEY, C. A. E. GILMORE, R. H. STIRLING, B. A. FAIRBAIRN, P. TULLY, G. H. INNES, W. BICKET, J. S. ARTON, D. BEVERIDGE, C. A. BRIGGS, A. E. ELIAS, R. MITCHELL, S. FINCH, T. B. WILSON and C. DIAMOND.

CARROLL F. SULLIVANT, administrative chief of the East Texas office of the Texas Railroad Commission at Kilgore, has been placed temporarily in charge of the commission's offices at Houston, replacing E. L. GREEN who resigned last week to accept a position with the Cabot Companies at Pampa, Tex. Mr. Sullivant, a native of Gainesville, Tex., was a former member of the Texas Legislature, serving for three years before joining the forces of the commission at Austin in 1933 as chief clerk and attorney of the Motor Transportation Department. He was later transferred to the East Texas district. He is a graduate of North Texas State Teachers College at Denton and of the Cumberland Law School.

H. C. WEISS, executive vice president of the Humble Oil and Refining Co., Houston, Tex., has returned from a deer hunt in Southwest Texas.

DWIGHT H. BOWMAN is the new purchasing agent for The Moorland Company, succeeding S. D. HUNT, who has been appointed assistant sales manager under EGAN KOEHLER, vice president and sales manager.

SAM A. MURPHY, independent operator, has moved from Winfield to Wichita, Kans., and will open offices in the Brown Building in Wichita January 1. His son, JOE MURPHY, formerly with Bovaird Supply Company, again will be associated with him in Kansas operations.

JAMES FITZGERALD, district geologist for the Skelly Oil Company, was elected president of the West Texas Geological Society; M. B. ARICK, Humble Oil & Refining Company, vice president; and DR. JOHN M. HILLS, Amerada Petroleum Corporation, secretary-treasurer. All are located at Midland.

WILLIAM F. McAFEE, of the International Harvester Company, has been elected vice president of the commercial car division of the Automobile Manufacturers Association, and E. C. FINK, president of Mack Manufacturing Corporation, was elected a director to fill the unexpired term of the late A. J. BROSSEAU.

F. E. LAKIN, vice president of the Shell Petroleum Corporation in charge of marketing, has appointed R. D. EBBERT, HARRY E. HALL, DAN E. LAVIN and WILLIAM L. SCHAFER as assistant general sales managers, in line with his decision to consolidate the company's service station, distributing and tankcar sales departments. D. H. SHEPERD, E. FOX, J. D. HAIRE and J. H. WAGNER will be head office assistants.

Here Is a Born Booster

Harvey W. Gilbert, president of the Gilbert Oil Company, Beaumont, Tex., is an incurable booster, according to friends, who say he was born that way and has the faculty of picking out worthwhile things to boost. Credit for much of the refining, oil-shipping and industrial development in the Beaumont-Port Arthur district of the Texas Gulf Coast is accorded him by other business men.

HARVEY W. GILBERT

Owner and operator of extensive oil and lumber proprietors, Mr. Gilbert is chairman of the Beaumont-Port Arthur Industrial Commission organized by business men of the two cities to promote the interests of the district. He is a civic leader in Beaumont and a writer on industrial topics. Mr. Gilbert was one of the principal promoters of the Beaumont-Port Arthur ship canal, which, opened in 1916, is now lined with refineries, shipping terminals and other industries and is believed to constitute the largest oil-refining and -shipping center in the world. He has been responsible for bringing several of the large refineries and other industries to the district.

Born in Beaumont in 1884, Mr. Gilbert has passed practically all his life in that city. His father was a pioneer Texas lumber manufacturer and oil producer. Wilbarger County was named for his great-great-grandfather. Mr. Gilbert graduated from the University of Virginia. He married Miss Hortense Gibbons, of Houston, Tex.

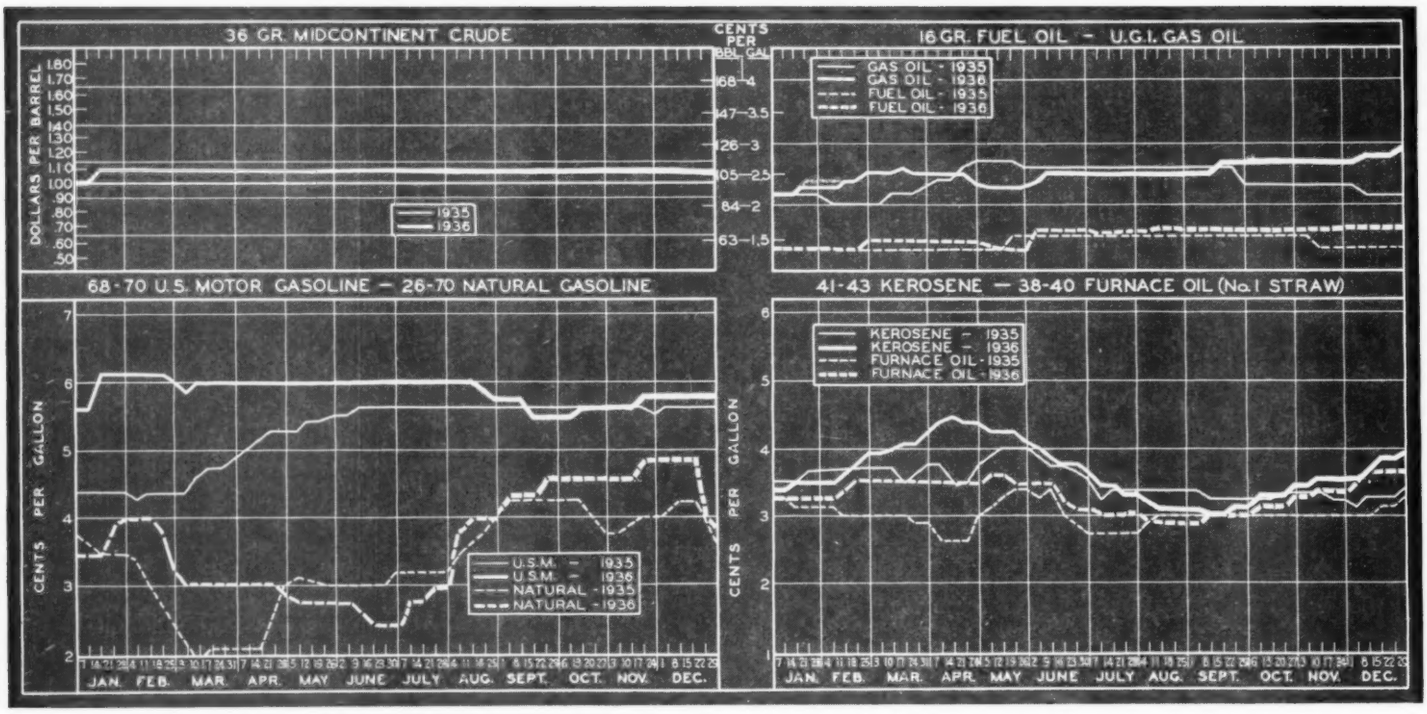
C. L. SUHR, chairman of the board of Pennzoil Company, who has been ill at his home in Oil City, Pa., recently returned to his office.

THOMAS W. LEACH, geologist and independent operator, and MRS. LEACH left Tulsa the day following Christmas to spend the year-end in Arkansas, visiting at Hot Springs and Pine Bluff.

E. C. MONCRIEF has resigned as chief geologist for the Derby Oil Company to engage in the oil business for himself. He will be associated with D. R. LAUCK, Wichita producer, in Kansas operations. The firm will be known as Lauck & Moncrief.

C. E. WRIGHT has been appointed superintendent of production for British American Oil Producing Company, effective January 1, it was announced by W. K. WHITEFORD, vice president in charge of the company's operations in the United States. He has been in charge of the company's operations at Oklahoma City. C. V. SIDWELL, in charge of British American field operations for 19 months, will head the company's new production engineering department which he will organize.

JAMES FITZGERALD, JR., heretofore district geologist for Skelly Oil Company in West Texas and New Mexico, is new head of the district land department, with headquarters at Midland, Tex. DANA M. SECOR, geologist in the Panhandle district, was transferred to Midland to replace Mr. Fitzgerald as geologist, and WILLARD F. BAILEY, geologist, was to be transferred to the Panhandle district to succeed Mr. Secor. W. C. FRITZ will be production geologist for the West Texas-New Mexico division under Mr. Secor.



Representative Mid-Continent Quotations on Crude Oil and Refined Products. Basis Oklahoma (Group 3)

Uncertainty Concerning Crude Prices Befogs Group 3 Refinery Market

By T. F. SMILEY

Fogginess overhung Group 3 markets this week, largely because prices of oil products must be governed by the price of crude; and guesses concerning the future of crude prices varied widely. Year-end conditions exerted an unsettling influence too. The coming week was expected to clarify the outlook with reference to crude prices and to other disturbing elements.

One fact stood out sharp and clear from the murkiness enveloping the general market, to-wit, the spanking demand for heating oil. Hen's teeth, familiar symbol of scarcity, took on an air of profusion and plenty by comparison with the available supplies of this material. Relatively mild weather throughout much of the consuming territory supplied by Group 3 refiners seemed to affect demand not at all.

KEROSENE BENEFITED

Kerosene was benefiting from the excited scramble for furnace oils. Untreated kerosene was reported to be moving in large volume to fill orders for the lighter distillates. It is being widely used as a range oil. Refiners who ordinarily are able to take care of customers from their own heating-oil output were buyers this week, driven to hunt in the open market for material with which to fill urgent orders. Kerosene jumped an eighth, as did most of those in the furnace oil group.

U.G.I. gas oil, already scarce, was even harder to get this week, with quotations up a notch.

Natural gasoline, which took a nasty fall two weeks ago when some material from western Kansas failed to find the immediate outlet it needed, was slipping to still lower levels in the past week. Suppliers and manufacturers who have limited storage facilities and must move their output promptly continued to encounter difficulty in disposing of growing stocks. The general disinclination to add to inventories at the close of the year made it still harder for the naturals to get hold of something to stop their descent. The offerings exerting pressure were said to come from the Oklahoma Panhandle and western Kansas. A definite rise in demand, with stiffening of prices, was expected to appear with the advent of the new year. In the meantime large manufacturers expressed themselves early this week as hesitant to accept orders for January at current prices.

Little or no change was observable in the lubricant group, though the new year was expected to bring a stronger market. Wax was steady.

The motor fuels continued their waiting attitude; but a more general expectation of higher tankcar prices accompanied the deepening belief that major buyers of crude would advance their prices next week. The advance in prices of Pennsylvania grade crude announced Monday of this week strengthened the position of those who have predicted the large buyers would follow the course of the Continental Oil Co., which announced a 17-cent advance, effective January 4. However, even those most confident of a general raise in the price of crude are not at all sure that the expected advance will be 17 cents. Most of them mention 10 or 12 cents as the probable extent of the raise.

HAVE MISGIVINGS

The smaller independent refiners in the Group 3 territory express hope that crude prices will not be advanced generally. They assert that they are unable to make a reasonable profit now and that if they were to pay more for their crude without a corresponding increase in the prices for refined products they would have to operate at a loss or shut down. Many integrated companies in Texas and Oklahoma are understood to prefer an increase in allowable production to an increase in the price of crude. Indicative of the shrinking crude supplies was a report this week that two major companies were in urgent need, having drawn on their stocks to a point considered dangerous.

Removal of uncertainty concerning crude prices next week is expected to improve the position of gasoline. Adding to the likelihood of a better market is the fact that purchases then can be made without inviting the penalty of taxation on year-end inventories. Consumption of the higher-octane motor fuels was reported to be holding up well.

Refined Oil Market Barometer

Notwithstanding year-end conditions which always act as a brake on buying, the refinery market holds promise of improved performance soon after the turn of the year. Some sections of it, now lagging, are expected to show renewed strength as soon as uncertainties concerning crude prices are removed. Burning oils increasingly vigorous, with kerosene keeping step. Gasoline holding its ground well.

MID-CONTINENT. Burning oils strong, scarce. Naturals off. Gasoline steady.

EAST COAST. Kerosene tight, tankcar prices advanced. Gasoline up.

GULF COAST. Gasoline firmer. Kerosene and burning oils strong.

CALIFORNIA. Cooler weather spurs demand for naturals. Heating oils strong.

PENNSYLVANIA. Motor gasoline off. Neutrals, bright stocks, wax strong.

CHICAGO. Burning oils scarce. Gasoline steady. Wax strong.

Kerosene Dominating Eastern Market; Product Is Being Tightly Held

By H. STANLEY NORMAN

NEW YORK, Dec. 29.—Dominance of kerosene in the eastern seaboard refined petroleum market continued last week and the product became so tightly held that tankcar and tank-wagon prices were generally advanced a half cent per gallon. Last week's was the second half-cent upward movement in kerosene prices since the middle of December.

Even with the attraction of a 5½-cent per gallon tankcar price for kerosene, many of the refiners and jobbers were unable to quote for open market, spot delivery. Due to the scarcity of stocks prevailing along the northeastern Atlantic territory, many refiners were making deliveries only to contract customers.

So far, there has been no change in retail kerosene prices, but in view of the higher tank-wagon and tankcar quotations it is probable that the increases will be passed on to the consumers in the near future. The retail movement of kerosene has been brisk throughout the northeastern territory and the ups and downs of the gasoline trade have not applied to the burning material business. Kerosene as a blending agent in producing fuel oil for domestic heating is in high demand, a condition which most oil marketers predicted on a basis of burner sales. The influence of extremely heavy fuel oil consumption, despite delay in the northeastern Atlantic territory of intense winter temperatures, has been exerted on all classes of light burning oils. Some New York district marketers raised their No. 2 and No. 4 burning oils a quarter of a cent per gallon to the tankcar trade late last week and others were expected to follow. A definite limit on the advance of fuel oil, however, is seen by some market observers. The tankcar prices now prevailing for the light fuels are nearing the point above which resellers will be forced to ask figures exceeding the top contract quotation on business engaged during the summer fuel slump.

Strength in kerosene was not entirely confined to the North Atlantic Coast but was also reported in the Gulf Coast district. Rumors were current in New York that a cargo of kerosene sold on the Gulf Coast last week for 5 cents per gallon. However, most marketers who engage in the Gulf Coast kerosene market extensively disclaimed knowledge of the sale at 5 cents and expressed belief that 4.75 to 4.875 is the top on the product. However, in view of the upward swing in eastern territory, the coastal market probably will respond in kind.

Increased call for kerosene in the New England and Atlantic seaboard districts was reflected in the Pennsylvania refining area and accelerated movement of this material reaching mentionable proportions after the middle of December continued through Christmas week. Despite the prior to December 15 sluggishness of kerosene movement from the Pennsylvania refining district, response of tankcar prices there to the improved seaboard market indicated that stocks were not excessive and probably incapable of supplying sustained demand. Under the stimulating effect of a brisk market for kerosene and other light fuel oils, some marketers are now criticizing the plane on which summer contract business was pitched. Conditions existing at the time summer contract business was being solicited regulated the prices incorporated in the agreements for over-the-winter delivery. There is a growing suspicion, however, that the scramble for gallonage in July and August was ill advised in light of present demand and that indicated for January, February and March.

Pennsylvania grade refiners continue to enjoy the entirely satisfactory market and consumption of neutral oils with comparatively gratifying call from purchasers of bright stock, seasonal restrictions considered. Stocks of both neutrals and brights are somewhat below seasonal expectations, particularly with regard to the former. More and more refineries are reporting their entire January production of neutrals committed to contract purchasers and the volume of material for winter oil preparation available on the open market is scarce. Jobbers depending on the open market for supplies of neutral are finding it difficult to satisfy their requirements. Prices have shown no quotable change, but with a good part of the production for January committed by contract there at least is no disposition toward weakening the existing structure. While less popular and handicapped by competitive conditions created by the bootleg coal business, heavy fuels are moving at satisfactory rate with prices unchanged. Diesel fuel oil at $1.65 per barrel in New York harbor and Bunker C fuel at $1.15 per barrel are in steady and reasonably heavy demand. At points more distant from sources of coal, the heavy oil market is even stronger than in New York and Philadelphia areas, but prices now prevailing seem fairly well established and gave indication of continuing on the unchanged basis for an indefinite interval. Consumption of Bunker C and other grades of heavy fuel oil in shore plants has more than offset the seasonal curtailment of shipping requirements. With production of industry in general launched on heavy winter programs, the demand for heavy fuels as a source of power probably will at least maintain the market now existing. Based purely on demand, the heavy fuels are in position to move forward, but marketers realize that competition with other fuels would be invited if any material increase is attempted. In view of the higher crude price prospects, however, it would not be surprising to the trade in general to see less effort expended on heavy fuel contracts in the future.

A general advance of a quarter-cent per gallon in all refinery tankcar gasoline prices was made Monday morning, December 28, throughout its northeastern territory by Socony-Vacuum Oil Co., Inc., followed by several other marketers up to Tuesday, indicating that it would become universal in the district. Socony-Vacuum also launched an advance ranging from two-tenths to three-tenths of a cent per gallon on its posted dealer prices at all points.

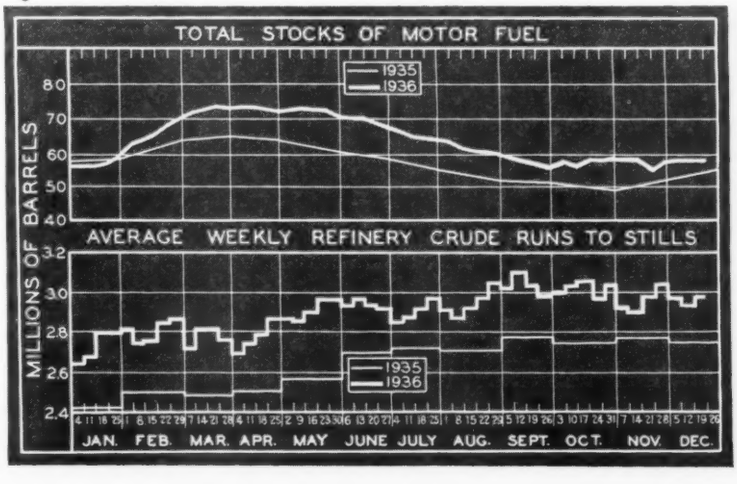
Continued uneasiness appears in the below 65 octane gasoline market in the Pennsylvania refining district, but the fuel is gradually losing favor even at price concessions in the northeastern territory and principal efforts are devoted to the higher grade. Pennsylvania refiners are enjoying satisfactory demand for 65 octane and above gasoline at currently quoted prices and stocks are reported entirely in keeping with shipping instructions.

Retail prices at most points in the northeastern zone are steady and unchanged. Only occasional reports of "normal" price disruption are heard from scattered points in the New England States. The "normal" price now established in most northeastern retail outlets varies from 16½ to 17 cents per gallon on the house brand products.

There is a rather logical expectancy that shipping instructions from refinery customers will be placed with greater freedom and more in keeping with long term requirements after turn of the year. Refiners point out that jobbers and other large consumers in the resale field are carefully gauging their orders against bare requirements.

A. P. I. Weekly Refinery Statistics

Refinery figures for the week ending December 26 not available.



RETAIL OIL MARKETS

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of December 29, 1936

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas a third grade and a premium grade are also available.

Discounts

Under the standard form of commercial consumer contract which went into effect March 1, 1934, save in California, Oregon, Washington, Arizona and Nevada, a discount of 1 cent a gallon off tank-wagon or 3 cents a gallon off retail prices is permitted for purchases between 4,000 and 10,000 gallons per month, or 4 cents a gallon off retail prices for purchases in lots of more than 10,000 gallons a month. The minimum delivery is 25 gallons.

Standard Oil Co. (Indiana)

	Gasoline			Kero.
	Tank wag.	Dlr.	Inc. tax	tank-wag.
Chicago, Ill.	15.7	13.7	4.0	9.5
Decatur	15.7	14.2	4.0	9.5
Joliet	14.8	14.2	4.0	9.5
Peoria	15.7	14.2	4.0	9.5
Quincy	15.5	14.0	4.0	9.3
Davenport, Ia.	15.7	14.2	4.0	9.5
Des Moines	15.5	14.0	4.0	9.3
Mason City	15.9	14.4	4.0	9.7
Sioux City	15.7	14.2	4.0	9.5
Duluth, Minn.	16.5	15.0	4.0	10.3
Mankato	16.1	14.6	4.0	9.9
Twin Cities	16.1	14.6	4.0	9.9
La Crosse, Wis.	17.1	15.6	5.0	9.9
Green Bay	17.4	15.9	5.0	10.2
Milwaukee	17.0	15.5	5.0	9.8
Detroit, Mich.	14.5	13.0	4.0	9.2
Grand Rapids	16.2	14.7	4.0	10.3
Saginaw	16.0	14.5	4.0	10.1
Evansville, Ind.	17.2	15.7	5.0	†10.0
Indianapolis	17.4	15.9	5.0	†9.0
South Bend	17.6	16.1	5.0	†9.0
Fargo, N. Dak.	17.1	15.6	4.0	10.9
Minot	18.3	16.8	4.0	12.1
Huron, S. Dak.	17.6	16.1	5.0	10.4
Kans. City, Mo.*	15.1	13.6	4.0	8.9
St. Louis*	15.4	13.9	4.0	9.2
St. Joseph*	15.1	13.6	4.0	8.9
Wichita, Kans.	14.6	13.1	4.0	8.3

*State tax 2 cents, 1-cent city tax and 1-cent federal tax. †Does not include 4-cent state tax.

(Exclusive of state general sales taxes, except Indiana and South Dakota.)

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gallons or more, 1.5 cents off; minimum delivery 25 gallons.

Stanolex Fuel Oil in Chicago

Effective Dec. 7, 1936, f.o.b. Chicago tank-wagon prices: Range oil, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.3 cents. Stanolex No. 1, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.0 cents. Stanolex furnace oil, 1-149 gallons, 7.8 cents; 150 gallons and over, 7.0 cents. Stanolex A, 1-399 gallons, 5.75 cents; 400 gallons and over, 4.75 cents. Stanolex B, 1-799 gallons, 5.75 cents; 800 gallons and over, 4.75 cents.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
Atl'tic City, N.J.	12.5	....	4.0	8.0
Newark	12.5	....	4.0	8.0
Annapolis, Md.	14.6	....	5.0	10.0
Baltimore	14.0	....	5.0	8.0
Cumberland	16.6	....	5.0	10.0
Wash'g'n, D.C.	12.0	15.5	3.0	9.0
Danville, Va.	17.3	....	6.0	12.9
Norfolk	16.0	....	6.0	11.3
Petersburg	16.3	19.8	6.0	11.7
Richmond	16.3	19.8	6.0	11.7
Roanoke	17.5	....	6.0	12.9
Charles'n, W.Va.	15.8	....	5.0	12.6
Parkersburg	15.1	....	5.0	11.2
Wheeling	15.0	....	5.0	12.2
Charlotte, N. C.	18.4	....	7.0	12.6
Hickory	18.9	....	7.0	13.0
Mt. Airy	18.7	....	7.0	12.4
Raleigh	18.0	....	7.0	12.1
Salisbury	18.5	....	7.0	12.7
Charleston, S. C.	17.0	20.5	7.0	11.1
Columbia	18.0	21.5	7.0	12.1
Spartanburg	18.7	22.2	7.0	12.9

Tank-wagon gasoline refers to dealer instead of retail price.

Price basis to commercial consumers, effective Nov. 2, 1936: On deliveries of 500 gallons or more by hose connection, consumer tankcar price plus .5 cent; less than 500 gallons, plus .75 cent, not taking deliveries by hose connection, plus 1 cent. Above schedule does not apply to North and South Carolina, and the greater portions of Virginia and West Virginia where the following is in effect: Up to 35,999 gallons per year, 2.5 cents over tankcar price; 36,000 to 119,999 gallons, 2.0 cents; 120,000 to 239,999 gallons, 1.5 cents; 240,000 to 479,999 gallons, 1.0 cent; over 480,000 gallons, .5 cent. Discount for kerosene, 1 cent off tank-wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except in New Jersey, where no discount (if necessary) is given.

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline			Kero
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
Atlanta, Ga.	20.5	22.5	7.0	*13.0
Augusta	19.5	....	7.0	*12.5
Macon	20.0	22.0	7.0	*14.0
Savannah	18.5	20.5	7.0	*12.5
Birm'ham, Ala.	21.0	23.0	8.0	12.0
Mobile	19.0	21.0	9.0	11.0
Montgomery	20.5	21.0	9.0	14.0
Jackson, Miss.	20.0	22.0	7.0	*12.5
Vicksburg	19.5	....	7.0	12.5
Jacksonville, Fla.	19.0	21.0	8.0	11.5
Miami	19.0	21.0	8.0	12.5
Pensacola	21.5	23.5	9.0	10.5
Tampa	19.0	20.5	8.0	11.5
Lexington, Ky.	18.0	20.0	6.0	11.0
Covington	17.5	....	6.0	10.5
Louisville	18.0	20.0	6.0	10.0
Paducah	16.5	....	6.0	8.0

*Includes 1 cent state tax. Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax; and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon. Pensacola, Fla., has a city gasoline tax of 1 cent.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline			Kero.
	Dealer	Serv. sta.	Inc. tax	tank-wag.
Denver, Colo.	17.0	....	5.0	11.0
Grand Junction	19.5	....	5.0	15.0
Pueblo	17.0	....	5.0	10.0
Casper, Wyo.	17.5	....	5.0	11.5
Cheyenne	17.5	....	5.0	13.0
Butte, Mont.	19.0	....	6.0	14.5
Billings	20.5	....	6.0	14.5
Helena	20.5	....	6.0	14.5
Great Falls	20.5	....	6.0	14.5
Salt Lake, Utah	19.0	....	5.0	16.0
Twin Falls, Ida.	21.0	....	6.0	18.0
Boise	20.5	....	6.0	18.0
Albu'que, N. M.	17.0	....	6.5	13.0

*Includes one-half cent city tax.

Discount to dealers with or without contract in Continental territory: Undivided dealer discount off service station price 4 cents except in Montana where a discount of 2 cents off tank-wagon price is allowed; divided dealer accounts 3½ cents.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline			Kero.
	Tank wag.	Dlr.	Inc. tax	tank-wag.
Omaha	18.1	16.6	6.0	9.8
McCook	18.8	17.3	6.0	10.5
Norfolk	18.5	17.0	6.0	10.2
North Platte	18.9	17.4	6.0	10.6
Scots Bluff	19.6	18.1	6.0	11.3

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective Jan. 1, 1935.

Pacific Coast Territory

STANDARD OIL CO OF CALIFORNIA

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
San Francisco	17.0	18.0	4.0	11.5
Los Angeles	16.5	17.5	4.0	9.0
Fresno, Calif.	17.5	18.5	4.0	11.0
Phoenix, Ariz.	20.5	21.5	6.0	‡16.0
Reno, Nev.	19.5	20.5	5.0	13.0
Portland, Ore.	19.5	20.5	6.0	13.5
Seattle, Wash.	19.5	20.5	6.0	13.5
Tacoma	19.5	20.5	6.0	13.5
Spokane	22.5	23.5	6.0	16.5

Discounts to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents; to split dealers, 2 cents. To commercial consumers: on tank-wagon price: on single deliveries of 40 gallons and over, advance quantity discount extended at time of delivery, 3 cents. Service station schedule applies on single deliveries less than 40 gallons. On kerosene in tankcar, transport truck and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank-wagon.

‡Includes 5-cent state tax.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline			Kero.
	Post. deal.	Serv. sta.	Inc. tax	tank-wag.
Albany, N. Y.	13.0	....	4.0	7.75
*Met. N. Y..				
Manhtn, Bronx	13.0	....	4.0	7.25
Staten Island	13.25	....	4.0	7.25
Q'ns & Brklyn	13.0	....	4.0	7.25
Buffalo	13.8	....	4.0	8.25
Rochester	13.8	....	4.0	8.25
Syracuse	13.8	....	4.0	8.75
Boston, Mass.	12.8	....	4.0	7.50
Portland, Me.	14.8	....	5.0	7.75
Manch'ter, N. H.	15.3	....	5.0	8.00
Burlington, Vt.	14.9	....	5.0	8.75

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes.

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline			Kero.
	Dealer	Serv. sta.	Inc. tax	tank-wag.
Muskogee, Ok.	15.0	....	5.0	7.0
Okla. City	15.0	....	5.0	8.0
Tulsa	15.0	....	5.0	8.0
Ft. Smith, Ark.	14.5	....	5.0	8.0
Little Rock	17.0	....	7.5	9.5
Texarkana	14.5	....	5.0	8.5

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline			Kero.
	Tank wag. dlr.	Serv. sta.	Inc. tax	tank-wag.
Philadelphia, Pa.	14.0	17.5	5.0	9.5
Pittsburgh	15.0	18.5	5.0	10.0
Allentown	14.0	....	5.0	10.0
Erie	14.0	....	5.0	10.0
Scranton	14.0	....	5.0	10.0
Altoona	15.0	....	5.0	10.0
Dover, Del.	14.0	....	5.0	10.0
Wilmington	13.0	....	5.0	10.0
Spring'f'd, Mass.	13.0	....	4.0	7.0
Worcester	13.5	....	4.0	7.5
Hartford, Conn.	12.9	....	4.0	7.0
New Haven	12.8	....	4.0	7.5
Providence, R. I.	11.5	....	3.0	7.0

Price basis to undivided dealers—Dealer tank-wagon less .5 cent per gallon.

Consuming accounts not under contract—when made by tank-wagon in quantities of 50 gallons or over, tank-wagon dealer price.

Commercial accounts under contract—annual consumption 2,500 to 100,000 gallons per year, 1 cent above posted tankcar price; over 100,000 gallons per year, .5 cent above posted tankcar price.

Naphtha

STANDARD OIL CO (INDIANA)

	Tank-wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15.0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150 gallon lots if covered by contract.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
N. Orleans, La.	19.5	23.0	*10.0	†11.0
Baton Rouge	17.5	21.0	8.0	11.5
Alexandria	18.0	....	8.0	9.5
Lafayette	18.5	....	8.0	12.5
Lake Charles	18.5	....	8.0	10.0
Shreveport	17.0	....	8.0	10.0
Knoxville, Tenn.	20.5	....	8.0	14.0
Memphis	18.5	22.0	8.0	9.5
Chattanooga	20.0	....	8.0	11.5
Nashville	19.5	....	8.0	10.0
Bristol	19.25	..	8.0	14.5

*Includes 2-cent parish tax. †Includes 1 cent parish tax and 1 cent state tax.

Price basis to commercial consumers: effective Dec. 21, 1936, deliveries of 50 gallons or more in one delivery, posted consumer tankcar price plus 2 cents per gallon; consumers taking deliveries of less than 50 gallons at one time pay posted consumer tankcar price plus 6 cents per gallon.

Louisiana kerosene prices include 1-cent state tax.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
Ohio points	17.5	(†)	5.0	*13.5

*Includes state tax of 1 cent.

†Following the leasing of service stations to dealers at many points the company no longer posts a statewide service station price.

Texas

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
Dallas, Tex.	13.5	17.0	5.0	8.5
Fort Worth	13.5	17.0	5.0	8.5
Houston	14.0	18.0	5.0	8.5
San Antonio	14.0	18.0	5.0	8.5

Tank-wagon price is to contract dealers and commercial consumers, the price to open dealers being .5 cent above tank-wagon price.

Canada*

3 Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
Hamilton, Ont.	21.0	23.5	6.0	17.0
Toronto, Ont.	21.0	23.5	6.0	17.0
Brandon, Man.	29.8	32.8	7.0	22.8
Winnipeg, Man.	28.2	31.2	7.0	20.7
Regina, Sask.	29.5	32.5	7.0	22.0
Saskatoon, Sask.	32.3	35.3	7.0	24.8
Edmonton, Alta.	30.5	33.5	7.0	24.2
Calgary, Alta.	28.0	31.0	7.0	21.5
Vancouver, B. C.	22.0	26.0	7.0	23.0
Montreal, Que.	18.5	....	6.0	17.5
St. John, N. B.	24.0	28.0	8.0	18.5
Halifax, N. S.	24.0	28.0	8.0	18.5

*Imperial gallon used in Canada.

Discount to dealers: Divided dealers pay 3 cents per gallon below station price; undivided dealers pay 4 cents per gallon below station price except in cities of Hamilton, Toronto and Montreal when discounts below station prices are one-half cent per gallon less and in Vancouver where discounts are 1 cent per gallon more.

Retail Price Changes

Standard Oil Co. (Indiana) December 23 advanced tank-wagon kerosene .3 cent in Detroit, Grand Rapids and Saginaw.

Standard Oil Co. of New Jersey December 19 advanced tank-wagon kerosene .5 cent in Newark.

Socony-Vacuum Oil Co., Inc., December 28 advanced posted dealer gasoline .3 cent in all points carried in the accompanying table except in Staten Island, where the advance was .25 cent, and in Burlington, where the advance was .2 cent.

To Reduce Dealers' Prices

Standard Oil Co. (Indiana) will reduce its prices to dealers for Solite with Ethyl one-half cent per gallon effective January 1, 1937. The differential between regular grade and Ethyl will thus become established at 1½ cents for dealers purchasing from tank-wagon, but will remain at 2 cents on tank-wagon sales to consumers.

Crude Oil Price Changes

Effective December 28, the South Penn Oil Co. advanced crude prices 15 cents per barrel on Pennsylvania Grade oil produced in West Virginia, southeastern Ohio and southwestern Pennsylvania. On the same date Tide Water Oil Co. advanced the price 12 cents per barrel in the Bradford and Allegany fields in McKean County, Pennsylvania, and Cattaraugus and Allegany counties, New York. The advances were met by other buyers.

O. H. Maryatt, of Pagosa Springs, Colo., manager of the Maryatt Drilling Co., was in Denver, Colo., on business recently.

PRICES OF REFINED PRODUCTS

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of December 29, 1936

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
62 octane and below (3d gr.)	.04¾	.04⅞
63-67 octane	.05¼	.05½
68-70 octane (regular)	.05¾	.05⅞
60-62 400 grades:		
62 octane and below (3d gr.)	.04¾	.04⅞
63-67 octane		.05⅜
68-70 octane (regular)	.05¾	.05⅞
64-66 375	.05	.05¼
68-70 360	.05¼	.05½

NORTH TEXAS—

U. S. Motor grades:		
62 octane and below	.04¾	.04⅞
63-67 octane	.05¼	.05½
68-70 octane (regular)	.05¾	.05⅞
60-62 400	.04¾	.04⅞
64-66 375	.05	.05⅛

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

U. S. Motor grades:		
62 octane and below	.05½	.05¾
63-67 octane	.06¼	.06½
68-70 octane (regular)	.06½	.06¾

ARKANSAS (Ark., N. La., Miss. del.)—

U. S. Motor grades:		
62 octane and below	.05½	.05¾
63-67 octane	.06¼	.06½
68-70 octane (regular)	.06½	.06¾

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
62 octane and below	.04¾	.04⅞
63-67 octane	.05⅛	.05¼
68-70 octane (regular)	.05¾	.05⅞
60-62 400 grades:		
62 octane and below	.04¾	.04⅞
63-67 octane	.05⅛	.05¼
68-70 octane (regular)	.05¾	.05⅞
64-66 375	.05	.05⅛
68-70 360	.05¼	.05⅜

PENNSYLVANIA (inland refineries)—

58-60 U. S. Motor:		
Below 60 octane		.05¼
60-64.9 octane		.07
65-70 octane		.07¼
64-66 375		.05½
68-70 350		.05⅝

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.07	.08
58-60 400	.07⅜	.08½

EAST COAST (domestic)—

U. S. Motor below 60 octane:		
*New York (Bayonne)		.06¼
Baltimore		.06¼
U. S. Motor, 60-64.9 octane:		
*New York (Bayonne)		.06½
Philadelphia	.06½	.06⅝
Boston		.06⅜
Baltimore	.06½	.06¾
Charleston, S. C.		.06¾
U. S. Motor, 65 and above:		
*New York (Bayonne)		.06⅝
Philadelphia	.06¾	.07
Boston		.07
Baltimore	.06¾	.07
Charleston, S. C.		.07

*All grades of gasoline one-eighth to one-fourth cent less for large shipments. New York harbor prices are for New York and New England delivery. Prices for New Jersey delivery one-fourth cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane	.05¼	.05⅜
60-64.9	.05⅜	.05¾
65 octane and higher	.05⅞	.06

Naphtha

PENNSYLVANIA (inland refineries)—

50-52 450 (blending)		.05⅛
52-54 450 (blending)		.05⅛
54-56 450 (blending)		.05¼

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70	.03¾	.04
Grade 18-55		.04½
Low vapor pressure grade:		
*14-pound v.p. (max.)	.05¼	.05⅜
*12-pound v.p. (max.)	.05½	.05⅝

*Nominal.

NORTH TEXAS—

Grade 26-70		.03⅜
Grade 18-55		.04½

CALIFORNIA—

75-85 375-390	.07	.07¾

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

Grade 26-70	.04⅛	.04¼

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 l.b.p., 110 flash, 540-550 e.p.	.03⅜	.03⅞
41-43 gr., 300-350 l.b.p., 110-125 flash, 500-520 e.p.	.03⅞	.04
46-48 gr., 210-230 l.b.p., 480 max. e.p.		.04½

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.03⅞	.04
42-44	.04	.04⅛

NORTH TEXAS—

41-43	.03⅞	.04

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

41-43	.03⅞	.04⅛

ARKANSAS (Ark., N. La., Miss. del.)—

41-43	.04¼	.04⅜

PENNSYLVANIA (inland refineries)—

45	.05	.05⅛
46	.05⅛	.05¼
47	.05¼	.05⅜

CHICAGO (Based on Group 3)—

41-43	.03⅝	.03¾
42-44	.03¾	.03⅞

CALIFORNIA (Pac. Coast market)—

38-40 high burning test	.03½	.05

NEW YORK (Bayonne, N. J.)—

41-43		.05

*GULF COAST (domestic)—

41-43		.04¾

*Barge price one-eighth cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

No. 1 prime white, 38-42	.03¾	.03⅞
No. 1 straw, 38-40	.03⅝	.03¾
No. 2 straw, 32-36	.03⅝	.03¾
No. 2 dark, 32-36	.03½	.03⅝
No. 3, zero to 15, 28-32	.03⅜	.03½
No. 3, 15 and above, 28-32	.02⅞	.03

NORTH TEXAS—

No. 1 prime white, 38-42		.03¾
No. 1 straw, 38-40	.03⅝	.03¾

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

No. 2, 32-36	.03⅜	.03½

ARKANSAS (Ark., N. La., Miss. del.)—

No. 2, 32-36		.03¾
No. 3, 28-32		.03½

CHICAGO (Based on Group 3)—

No. 1 prime white, 38-40	.03⅝	.03⅞
No. 1 straw, 38-40	.03½	.03⅝
No. 2 straw, 32-36	.03½	.03⅝
No. 2 dark, 32-36	.03⅜	.03⅝
No. 3, zero to 15, 28-32	.03⅜	.03⅝
No. 3, 15 and above, 28-32	.02⅝	.02⅞

NEW YORK (Bayonne, N. J.)—

*No. 1		.05
*No. 2		.04½
*No. 4		.04¼

*Barge deliveries one-eighth to one-fourth cent under above, tankcar price.

Gas Oil and Fuel Oil

(Gas oil per gal., fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02⅞	.03
No. 4, low cold test, 24-28	.95	1.05
No. 4, 15 and above, 24-28	.80	.85
No. 5, low cold test, 18-22	.75	.80
Below 18 fuel oil, industrial	.70	.75

NORTH TEXAS—

U.G.I. gas oil		.02⅞
No. 4, low cold test, 24-28	.95	1.00
No. 5, low cold test, 18-22	.75	.80
Below 18 fuel oil, industrial	.65	.75

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

U.G.I. gas oil	.02⅝	.02¾
10-14 fuel oil, industrial	.70	.75

ARKANSAS (Ark., N. La., Miss. del.)—

10-14 fuel oil, industrial	.60	.65

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02½	.02⅝
No. 4, low cold test, 24-28	.95	1.00
No. 4, 15 and above, 24-28	.80	.85
No. 5, low cold test, 18-22	.77½	.80
No. 6, low cold test, 10-16	.65	.70

PENNSYLVANIA (inland refineries)—

36-40	.04½	.04⅝

CALIFORNIA—

Los Angeles:

30-34- gas oil, per bbl.	.95	1.15
24 plus diesel	1.00	1.25
24 plus diesel (bunkers)	1.05	1.30
12-16 (bunkers at tidewater)	.85	.95
10-16 (cargo lots)	.75	.95
12-17 (tankcars)	.70	.95
San Joaquin Valley:		
10-18 (tankcars)	.70	.75
San Francisco:		
27 plus diesel		1.35
24 plus diesel (bunkers)		1.35
10-16 (bunkers)		1.00

GULF COAST—

28-30 gas oil	.03½	.03⅝
28-30 diesel (bunkers)		1.50
Bunkers (bulk cargoes)		.95
Bunker C (bunkers)		.95

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.04½
28-30 diesel (lighterage 6¼ per bbl.)		1.65
28-30 diesel (tankcars)		.04½
*Bunker C (to ocean-going ships in N. Y. harbor)		1.15
Industrial fuel (tankcars)		.04

*Lighterage charge 5c bbl. additional.

Bright and Steam-Refined

OKLAHOMA (Group 3)—

Bright Stocks:

190-200 D, 15-25		.20
150-160 D, 0-10		.17
150-160 D, 15-25		.16½
150-160 E, 15-25		.16
100-110 D, 0-10		.15½

Steam refined:

631 green (treated)		.13
600 dark green (untreated)		.05

PENNSYLVANIA—

Bright stocks (Pennsylvania grade No. 8 color, 145-50 at 510, 540-550 flash):

10 pour test	.24	.24½
15 pour test	.23	.23½
20 pour test	.22	.22½
25 pour test	.21	.21½

Steam refined:

600	.13	.13½
650	.14½	.15
600 Pennsylvania flash	.15½	.16
630 flash	.17	.17½
600 Warren E filtered	.16	.16½

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

Zero to 10 Cold Test:

150-3		.08½
180-3		.09½
180-4		.09
260-3		.10
200-4		.09½
250-3		.11
250-4		.10½
280-3		.12
280-4		.11½
300-3½		.12½
400-3½		.13½
100-2½ paraffin oil		.05⅝

15-20 Cold Test:

200-3		.09½
200-4		.09
250-3		.10½
250-4		.10
280-3		.11½
280-4		.11

GULF COAST—

Pale Oils:

200-3	.06½	.07
300-3	.07	.07½
500-3½	.08	.08½
750-3½	.08½	.09
1,200-3½	.09¼	.09½
2,000-4	.09½	.10

Red Oils:

200-5-6	.06¾	.07
300-5-6	.07	.07½
500-5-6	.08	.08½
750	.08½	.09
1,200-5-6	.09	.09½

CALIFORNIA (moving to dom. market)

Pale Oils:

100-2½-3		.06
200-2½-3		.06¼
300-2½-3		.06½
400-3-4	.08½	.09¼
450-3-4	.09¾	.10
550-3-4	.10	.10¼
600-3-4	.10¼	.10½

Red Oils:

200-4-5		.06
300-5-6		.06¼
350-5-6	.07	.08
400-5-6	.08	.08¼
450-5-6	.08¼	.08½
500-5-6	.08½	.09
600-5-6½	.09	.09½
700-6½ plus	.09¾	.10
750-6½ plus	.10	.10¼
900-6½ plus	.10¼	.10½

PENNSYLVANIA—

150 vis. at 750° F. color, 400-405 flash:

Zero pour test	.21½	.22
10 pour test	.20½	.21
15 pour test	.20	.21½
25 pour test	.19	.19½

180 vis. at 70° F., 3 color:

25 pour test	.21½	.22

200 vis. at 70° F., 3 color:

Zero pour test	.25	.25½
10 pour test	.24	.24½
15 pour test	.23½	.24
25 pour test	.22½	.23

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale	.02⅝	.02¾

PENNSYLVANIA (inland refineries)—

122-124 (a.m.p.) w.c. scale	.0245	.0250
124-126 (a.m.p.) w.c. scale	.0250	.0255

NEW YORK—

Wax in bags fully refined:

122-125 (a.m.p.) wax		.0445
125-127 (a.m.p.) wax		.0455
128-130 (a.m.p.) wax		.0480
130-132 (a.m.p.) wax		.0505
133-135 (a.m.p.) wax		.0535
135-137 (a.m.p.) wax		.0560
124-126 (a.m.p.) w.s.	.0240	.0250
124-126 (a.m.p.) y.s.	.0240	.0245

Petrolatum in barrels, carload lots:

Dark green		.01⅞
Amber	.02⅞	.03
Extra amber	.03	.03⅛
Lily white	.06⅝	.06¾
Snow white	.07¾	.07⅞
Cream	.05⅝	.05¾

Export Prices

GASOLINE

GULF COAST—

U. S. Motor		.05¼
60-62 400		.05⅝
61-63 390	.05⅜	.05½
64-66 375		.05⅝

LOS ANGELES—

U. S. Motor grades:

53-55 octane		.04¾
55-65 octane	.04¾	.05
65-67 octane		.05
67-69 octane		.05¼
Above 69 octane	.05½	.06

KEROSENE

GULF COAST—

41-43 prime white		.04⅝
41-43 water white		.04½
44 water white		.05

LOS ANGELES—

41-43 water white	.04½	.05

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.a.s. in bbls.)—

Cylinder Stocks:

600 Warren E		.22½
600 S.R. unfiltered		.20
650 S.R. unfiltered		.20¾
600 flash S.R.		.22
630 flash S.R.		.24½

Bright stocks:

8 color		.29½
6½ plus color in dilution		.28

NEUTRAL OIL

200-3 color		.27½
150-3 color		.24

PARAFFIN WAX

NEW YORK (prices per pound)—

123-125 a.m.p.		.04125
125-127 a.m.p.		.0425
128-130 a.m.p.		.0450
133-135 a.m.p.		.0525
135-137 a.m.p.		.0550
Crude scale:		
124-126 w.s.	.0260	.0270
124-126 y.s.	.0245	.0250

CRUDE OIL PRICES

Oklahoma, Kansas, North Central and East Central Texas

(January 9, 1936)

East Texas*	$1.15
Van, Tex.†	1.02
Talco (Nov. 1, 1936)	.65
Altus and Tipton, Okla.‡	1.08
Other fields (see gravity table).	

*All companies. †Pure Oil Co. ‡Gulf Oil Corp. Talco by Humble Oil & Refining Co.

West Texas

Crane, Upton, Howard, Glasscock and Mitchell counties	$ .80
Winkler County	.85
Lea County, N. Mex.	.85
Pecos County*	.85
Pecos shallow†	.75

*Shell Petroleum Co., Gulf Pipe Line Co., and Humble Oil & Refining Co. †Shell Petroleum Corp.

Note—For Humble, Magnolia and Texas Co.'s West Texas and Lea County prices see gravity table. Above prices are those of other buyers.

Gulf Coast

(January 9, 1936)

Cleveland, Tex.	$1.10
Hardin, Tex.	1.03
Greta, Tex. (Nov. 1, 1936)	.95
Refugio, Tex., heavy (Nov. 1, 1936)	.95
Tomball, Tex.	1.30
Lafitte, La.	1.12
Livingston, Tex.	1.15
Bosco, La. (Jan. 16, 1936)	1.05
Evangeline, La.	1.07
O'Connor (Nov. 1, 1936)	.95
McFaddin (Nov. 1, 1936)	.95
Satsuma (Nov. 1, 1936)	1.15
Heyser, light (Nov. 1, 1936)	1.15
Heyser, heavy (Nov. 1, 1936)	.90
Placedo (Nov. 1, 1936)	.90
Plymouth (Nov. 1, 1936)	
...See gravity table for Gulf Coast pools	
Welsh, La.	.96

Rocky Mountain States

(Effective January 9, 1936)

Iles, Colo., light*	$1.06
Iles, Colo., heavy*	1.00
Greybull, Wyo.*	1.25
Torchlight, Wyo.*	1.28
Grass Creek, Wyo., light*†	1.18
Grass Creek, Wyo., heavy (Nov. 4, 1936)*†	.62
Hamilton Dome, Wyo. (Nov. 4, 1936)*	.57
Elk Basin, Wyo., light *†	1.18
Frannie, Wyo., heavy*	.62
Frannie, Wyo., light (Nov. 4, 1936)	.70
Hogback, N. Mex.*	1.21
Pondera, Mont. (Jan. 26, 1936)*	1.05
Salt Creek, Dutton Creek and Midway, Wyo., take Stanolind's Oklahoma prices on a gravity basis.	
Big Muddy, Wyo.†	1.11
Rock Creek, Wyo. (Nov. 1, 1936)†	1.08½
Artesia, N. Mex. (Jan. 9, 1936)‡	.80
Maljamar, N. Mex. (Jan. 9, 1936)‡	.80
Fort Collins and Wellington, Colo. (Jan. 9, 1936)‡	See Note
Florence, Colo.	.98
Lance Creek, Wyo.	.85
Lost Soldier, Wyo. (Sept. 30, 1933)	.88
Hudson, Wyo. (June 2, 1931)	.65
Sunburst, Mont. (June 5, 1936)	1.15
Cat Creek, Mont.	1.28
Cut Bank, Mont.	1.35

Note—Fort Collins and Wellington are not posted, price 5 cents under quotation of Salt Creek crude of like gravity (Fort Collins 36°; Wellington 33°). *Stanolind Oil & Gas Co. †Ohio Oil Co. ‡Continental Oil Co. Cut Bank by Toronto Pipe Line Co.

Middle Western States

OHIO OIL CO.

Lima (Sept. 22, 1936)	$1.15
Illinois (Jan. 9, 1936)	1.23
Princeton, Ind. (Jan. 9, 1936)*	1.23
Midland, Mich. (Sept. 16, 1936)*	1.32
Midland, Mich. (Sept. 28, 1936)†	1.37
West Branch, Mich. (Sept. 16, 1936)	1.16
Muskegon, Mich.	1.00
Eastern Kentucky:	
Big Sandy River (Jan. 9, 1936)	1.30
Kentucky River (Jan. 9, 1936)	1.38
Western Kentucky (Nov. 1, 1936)	1.28

*Posted by Simrall Corp. and Pure Oil Co. and includes Greendale, Porter, Beaverton and Crystal crudes. West Branch, Mich., by Simrall Corp. Eastern Kentucky crude purchased by Ashland Refining Co., Ashland, Ky. †Old Dutch Refining Co.

Southwest Texas

(January 9, 1936)

Saxet (Nov. 1, 1936)	.95
Mirando (Nov. 1, 1936)	.90
Pettus	1.25
Taft (Nov. 1, 1936)	.95
Salt Flat*	.97
Salt Flat‡	.97
Darst Creek*	.97
Darst Creek†	.97
Luling	.90
Lytton Springs	1.00
Duval County	.85
Flour Bluff (Nov. 1, 1936). See gravity table	

*Humble Oil & Refining Co. †Magnolia Petroleum Co., Gulf Pipe Line Co. and Texas Co. ‡Shell Petroleum Corp. Saxet posted by Humble and Texas; Mirando by Humble and Magnolia; Pettus by Humble; Salt Flat by Humble; Luling and Lytton Springs by Magnolia; Duval by Texas Co.

North Louisiana and Arkansas

Smackover, all grades (Jan. 10, 1936)*	$.75
Smackover, all grades (Jan. 9, 1936)†	.80
Tullos and Urania (Jan. 10, 1936)	.97
Nevada, Ark. (Jan. 10, 1936)	.65
El Dorado East field (Jan. 16, 1936)	.75
Converse, Holly, Pleasant Hill and Zwolle (Jan. 10, 1936)*	1.10
Lisbon, Ark. (Jan. 10, 1936)*	1.10
Elm Grove, La. (Jan. 10, 1936)	.80

*Standard Oil Co. of Louisiana, Gulf Refining Co., Louisiana Oil Refining Co., Texas Co. (effective January 14) and Magnolia Petroleum Co. (effective January 16). Urania by H. L. Hunt Co. and Louisiana Oil Refining Co. Nevada by Standard of Louisiana, El Dorado East field by Magnolia Petroleum Co. Phillips Petroleum Co. (effective January 17), posts 75 cents for all grades in Union and Ouachita counties, Arkansas.

Eastern States

TIDE WATER PIPE LINE CO.

(Effective Dec. 28, 1936)

Bradford, Pa.	$2.57
Allegany, N. Y.	2.57

SOUTH PENN OIL CO.

(Effective Dec. 28, 1936)

Pennsylvania Grade Oil in National Transit Lines (Bradford field)	2.57
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	2.32
Pennsylvania Grade Oil in Eureka Pipe Line lines	2.27
Pennsylvania Grade Oil in Buckeye Pipe Line lines	2.12
Corning Grade Oil in Buckeye Pipe Line Co.'s lines (Sept. 18, 1936)	1.31

PENNZOIL CO.

(Effective Dec. 28, 1936)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	2.57
Includes Cochran, Franklin, Hamilton and Doolittle districts.	
Group B	2.56
Includes Tidioute district.	
Group C	2.55
Includes Turkey and Tidioute districts.	
Group D	2.54
Includes Bear Creek and Porkey districts.	
Group E	2.51
Includes Elderneau, Bull Creek, Rough Run, Carbon, Dipner, Bradlin, McJunkin, Jameson, Kenerdell, Emlenton, Tiona, Lacey and Kinzua districts.	
Price depends on lengths of pipe line haul to plant at Oil City.	

PURE OIL CO.

(Effective Dec. 28, 1936)

Cabin Creek, W. Va.	2.27
Bradford Hollow, W. Va.	2.27
Kelly Creek, W. Va.	2.27

Canada

Ontario (Sept. 9, 1933):*	
Petrolia	$2.10
Oil Springs	2.17
Turner Valley, Alberta province (Dec. 16, 1936):†	
Clear naphtha	$2.60
Discolored naphtha, 65 gravity and and higher	2.36
Discolored naphtha and crude oil, 40-40.9 gravity	1.55
Increasing 3 cents for each degree of gravity with top price for 64-64.9 gravity	2.27

These prices delivered field tankage.
*Imperial Oil, Ltd.
†Imperial Oil, Ltd., and Regal Oil & Refining Co. On crude oil alone British American Oil Co. posted above prices on December 9, 1936.

Mexico

Panuco*	$0.96

*F.o.b. ship, based on November transactions and exclusive of production and export taxes and bar dues.

Crude Prices by Gravities

Gravity—	Oklahoma, Kansas and Salt Creek, Wyo.	Central and North Texas	East Central Texas	North Louisiana, Arkansas	Gray County, Texas	Carson and Hutchinson Counties, Texas	Conroe, Texas	West Texas and Lea County, New Mexico	Gulf Coast, Texas and Louisiana	Flour Bluff, Turtle Bay Anahuac Dickinson, Texas	Iowa and Cameron Meadows, Texas
Below 20	....	....	....	....	....	....	....	....	$.92	....	$.82
20-20.9	....	....	....	....	....	....	....	....	.94	....	.84
21-21.9	....	....	....	....	....	....	....	....	.96	....	.86
22-22.9	....	....	....	....	....	....	....	....	.98	....	.88
23-23.9	....	....	....	....	....	....	....	....	1.00	....	.90
24-24.9	....	....	....	....	....	....	....	....	1.02	....	.92
Below 25	$.86	....	....	$.78	....	....	....	....	....	....	....
25-25.9	.88	....	....	.80	....	....	....	....	1.04	....	.94
26-26.9	.90	....	....	.82	....	....	....	....	1.06	....	.96
27-27.9	.92	....	....	.84	....	....	....	....	1.08	....	.98
28-28.9	.94	....	....	.86	....	....	....	....	1.10	....	1.00
Below 29	.94	$.84	$.91	....	....	....	....	$.75	....	....	....
29-29.9	.96	.86	.93	.88	....	....	....	.76	1.12	....	1.02
30-30.9	.98	.88	.95	.90	....	....	....	.78	1.14	$1.04	1.04
31-31.9	1.00	.90	.97	.92	....	....	....	.80	1.16	1.06	1.06
32-32.9	1.02	.92	.99	.94	....	....	....	.82	1.18	1.08	1.08
33-33.9	1.04	.94	1.01	.96	....	....	....	.84	1.20	1.10	1.10
34-34.9	1.06	.96	1.03	.98	....	....	....	.86	1.22	1.12	1.12
Below 35	....	....	....	....	$.86	$.81	....	....	....	....	....
35-35.9	1.03	.98	1.05	1.00	.88	.83	$1.24	.88	1.22	1.14	1.12
36-36.9	1.10	1.00	1.07	1.02	.90	.85	1.26	.90	1.22	1.16	1.12
37-37.9	1.12	1.02	1.09	1.04	.92	.87	1.28	.90	1.22	1.18	1.12
38-38.9	1.14	1.04	1.11	1.06	.94	.89	1.30	.90	1.22	1.20	1.12
39-39.9	1.16	1.06	1.13	1.08	.96	.91	1.32	.90	1.22	1.22	1.12
40 and over	1.18	1.08	1.15	1.10	.98	.93	1.34	.90	1.22	1.24	1.12

STANDARD OIL CO. OF CALIFORNIA AND UNION OIL CO.

Crude oil prices at the well effective June 22, 1936

Gravity—	Signal Hill (Long Beach)	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda-Brea Canyon	Athens-Rosecrans	Dominguez	Elwood Terrace	Torrance	Richfield	Whittier E. Coyote (La Habra)	Montebello	W. Coyote Hills	Santa Fe Springs	Mountain View	Elk Hills Buena Vista Hills Midway-Sunset Lakeview Area	East Hills	Coalinga	Wheeler Ridge	Kettleman Hills	Santa Paula*	Orcutt*
14-14.9	$.80	$.79	$.74	$.78	$.79	$.80	$.76	....	....	....	$.80	$.76	$.76	$.77	$.78	....	....	$.70	$.70	$.70	....	....	$.70	....
15-15.9	.80	.79	.74	.78	.79	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.70	.70	.70	....	....	.70	....
16-16.9	.80	.79	.74	.78	.79	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.70	.70	.70	....	....	.70	$.70
17-17.9	.80	.79	.74	.78	.81	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.70	.70	.70	....	....	.71	.70
18-18.9	.80	.79	.74	.78	.84	.80	.78	....	....	....	.82	.76	.76	.77	.78	....	....	.70	.70	.70	....	....	.73	.72
19-19.9	.82	.79	.74	.82	.87	.84	.81	....	....	....	.85	.76	.78	.77	.78	....	$.70	.74	.74	.71	$.70	....	.75	.74
20-20.9	.85	.79	.74	.85	.90	.88	.84	....	....	....	.88	.78	.92	.77	.80	....	.70	.78	.78	.72	.70	....	.77	.77
21-21.9	.88	.79	.74	.89	.93	.93	.88	....	....	....	.91	.80	.85	.77	.84	$.78	.73	.82	.82	.74	.70	....	.79	.80
22-22.9	.92	.82	.74	.92	.96	.98	.92	....	....	....	.93	.84	.89	.79	.88	.78	.77	.87	.86	.78	.72	....	.82	.83
23-23.9	.95	.86	.77	.96	.99	1.02	.96	$.84	$.79	....	.96	.88	.93	.82	.92	.78	.80	.92	.90	.82	.76	....	.85	.86
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	....	.99	.91	.96	.85	.96	.82	.84	.97	.94	.86	.79	....	.87	.88
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	....	1.02	.95	....	.89	.99	.86	.88	1.01	.98	.90	.83	....	.90	.91
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	....	1.05	.98	....	.92	1.03	.90	.91	1.06	1.02	....	....	....	.92	.93
27-27.9	1.10	1.05	.88	1.11	1.12	....	1.10	1.03	.88	....	....	1.02	....	.96	1.06	.95	.95	1.10	1.06	....	....	....	.95	....
28-28.9	1.14	1.10	.90	1.14	1.15	....	1.14	1.07	.90	....	....	1.06	....	.99	1.10	.99	.99	1.15	1.10	....	....	....	.97	....
29-29.9	1.17	1.15	.93	1.18	1.18	F.O.B.	1.17	1.12	.93	....	....	1.09	....	1.03	1.14	1.03	1.02	1.20	1.14	....	....	....	.99	....
30-30.9	1.21	1.19	.95	1.22	1.21	our	1.21	1.17	.95	F.O.B.	....	....	....	1.07	1.17	1.08	1.06	1.25	1.18	....	....	....	1.01	....
31-31.9	....	....	....	....	1.24	Pipe	1.24	1.22	.97	Ship	....	....	....	1.11	1.21	1.12	1.09	1.29	....	....	....	....	....	....
32-32.9	....	....	....	....	1.27	Line	1.27	1.27	1.00	....	....	....	....	1.14	1.25	1.16	1.13	1.34	....	....	....	....	....	....
33-33.9	....	....	....	....	....	....	....	1.32	....	$1.28	....	....	....	1.18	1.28	1.20	1.17	1.38	....	....	....	$1.19	....	....
34-34.9	....	....	....	....	....	....	....	1.37	....	1.32	....	....	....	1.22	1.32	1.25	1.20	....	....	....	....	1.23	....	....
35-35.9	....	....	....	....	....	....	....	1.42	....	1.35	....	....	....	1.25	....	1.29	....	....	....	....	....	1.27	....	....
36-36.9	....	....	....	....	....	....	....	1.46	....	1.39	....	....	....	1.29	....	1.33	....	....	....	....	....	1.31	....	....
37-37.9	....	....	....	....	....	....	....	1.51	....	1.43	....	....	....	1.32	....	1.37	....	....	....	....	....	1.35	....	....
38-38.9	....	....	....	....	....	....	....	1.56	....	....	....	....	....	1.36	....	1.42	....	....	....	....	....	1.39	....	....
39-39.9	....	....	....	....	....	....	....	1.61	....	....	....	....	....	1.40	....	....	....	....	....	....	....	1.43	....	....
40-40.9	....	....	....	....	....	....	....	1.66	....	....	....	....	....	1.43	....	....	....	....	....	....	....	....	....	....

Newhall, McKittrick, Kern River, Kern Front and Round Mountain, 70 cents for all grades. *Posted by Union Oil Co. Same company's Brea Canyon schedule stops at $1.14 for 28 degrees and over, and Belridge and Lost Hills schedule stops at $1.33 for 37 degrees and over.

MARKET RECORD, ACTIVE OIL STOCKS

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1936 High	1936 Low	Week ended Dec. 24 Sales	Week ended Dec. 24 High	Week ended Dec. 24 Low	Week ended Dec. 24 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1936	1935 High	1935 Low	1934 High	1934 Low
125½	75	3,600	102½	98⅛	101	Amerada Corp.	788,675	N.P.	50cQ	10-31-36	$2.00	80	48½	55⅝	39
35⅛	26⅝	23,100	31⅞	29¼	31½	Atlantic Refining	2,664,904	$25	50cQ¶	12-15-36	1.25	28	20½	35¼	21½
38½	21	12,800	36½	34⅛	35½	Barber Co.	387,149	$10	50c	12-10-36	.50	22½	11¾	23½	12
28¼	14⅛	83,400	28¼	21½	27¾	Barnsdall Oil Co.	2,131,090	$5	20cQ	11-2-36	.80	14¾	5⅞	10	5⅞
23⅜	14	39,800	17⅞	16⅞	17¼	Columbia Gas & Elec.	11,610,036	N.P.	20c	11-16-36	.40	15¾	3⅜	19¼	6⅝
15½	11½	108,500	15½	14	15⅜	Consolidated Oil Corp.	13,983,287	N.P.	40cQ¶	11-16-36	.80	12¼	6½	14¼	7¼
44	28⅛	24,900	44	40⅞	43⅞	Continental Oil of Delaware	4,682,671	$5	25c Spl.	12-15-36	1.50	35	15⅛	22¾	15¾
13⅞	6⅜	28,600	13⅛	11⅜	13⅛	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	7	1½	5⅝	2½
30⅞	17¼	5,600	30	28⅛	29⅞	Mid-Continent Petroleum	1,843,872	$10	75cSA	12-1-36	1.15	20½	9½	14¾	9⅛
29¾	16¾	3,200	28⅜	25⅛	28	Mission Corporation	1,399,345	N.P.	....	.....	.45	17¾	10⅜	..	..
75½	19⅞	900	68	66½	68	National Supply of Delaware	382,591	$25	....	5-15-31	....	20⅞	9	21⅛	10
17½	12⅛	33,100	16½	15	16½	Ohio Oil Co.	6,563,377	N.P.	35cSA	12-15-36	.60	14¼	9¼	15⅞	8½
22¾	11¾	4,900	22⅛	20	22	Pacific Western Oil	1,000,000	N.P.	65c	12-18-36	.65	14	6¾	9⅜	5½
4¼	1⅜	300	3⅜	3	3	Panhandle P. & R.	198,770	N.P.	....	.....	....	1⅞	½	2½	⅝
50½	38⅛	35,400	50½	46¾	50¼	Phillips Petroleum	4,152,836	N.P.	$1Q¶	12-1-36	2.50	40	13¾	20¾	13⅜
25	11⅞	13,400	25	22⅛	24⅝	Plymouth Oil Co.	1,050,000	$5	40c	12-22-36	.90	13	6½	16¾	7¼
24⅞	16	82,000	20¼	17⅜	20¼	Pure Oil Co.	3,038,370	N.P.	....	9-1-30	....	17	5⅞	14⅞	6⅛
43⅝	30½	17,500	42¼	37⅛	41⅛	Seaboard Oil of Delaware	1,244,283	N.P.	25cQ	12-15-36	1.00	36⅞	20¾	33⅜	20¾
28	14¾	7,000	26⅞	26	26¾	Shell Union Oil	13,070,625	N.P.	25c	12-15-36	.25	16½	5½	11½	6
127½	102¼	2,600	102¾	102	102	Shell Union Oil 5½% pfd.	400,000	$100	26¼c	12-15-36	28.87½	111	63⅛	89	57
6¾	3½	2,200	4	3⅞	3⅞	Simms Petroleum	461,698	$10	$1.25 liq.	7-20-36	2.25 liq.	18¾	4¾	17⅛	7¼
44⅜	19½	4,800	44¾	40⅝	44⅜	Skelly Oil	1,008,514	$15	....	12-15-30	....	20½	6½	11½	6
17½	12½	54,900	16	15¼	16	Socony-Vacuum	31,151,075	$15	25cSpl.	12-15-36	.70	15¾	10⅝	19⅞	12½
47⅝	35	39,200	41¾	39	41½	Standard Oil of California	13,014,754	N.P.	30cQ¶	12-15-36	1.20	41⅛	27¾	42⅞	26½
45½	32¾	18,200	45½	42⅝	45⅝	Standard Oil (Indiana)	15,215,677	$25	$1.25Q¶	12-15-36	2.40	33⅜	23	32¾	23¼
31	25	No sales ..	..	..	..	Standard Oil of Kansas	200,000	$10	$1	12-26-36	1.00	32	20	41	26
70⅛	51⅛	49,700	68¾	65½	68⅛	Standard Oil of New Jersey	25,856,081	$25	$1.25SA¶	12-15-36	2.00	52⅜	35¾	50⅛	39¼
91	70	1,200	75¼	70¼	75	Sun Oil	1,733,013	N.P.	25cQ**	12-15-36	$1 & 6% Stk.	77	60½	74¼	51½
54½	28⅞	40,100	54½	40¾	53½	Texas Corp.	9,340,069	$25	25cQ†	1-1-37	1.50	30¼	16½	29⅜	19⅝
8⅞	4⅜	23,000	8½	7½	8⅛	Texas Gulf Producing Co.	888,094	N.P.	5c	12-15-36	.05	4¾	2½	7	3⅜
15⅛	7½	20,100	13⅝	12⅜	13¼	Texas Pacific Coal & Oil	880,703	$10	25c	8-1-36	.25	9¼	3¼	6½	2½
21⅝	14⅜	14,900	20⅞	19¼	20¾	Tide Water Associated	5,642,342	N.P.	15cQ	12-1-36	.70	15⅞	7⅝	14⅜	8
106½	100⅝	1,400	105¼	104½	105	Tide Water Associated pfd.	626,221	$100	$1.50Q	1-2-37	6.00	104½	84	87	64½
28½	20¾	6,400	24⅞	23¼	24½	Union Oil of California	4,386,070	$25	25cQ	11-10-36	1.00	24	14¾	20½	11½
31⅝	22⅝	600	26⅝	26¼	26¼	Union Tank Car Co.	1,200,000	N.P.	30cQ	12-1-36	1.20	26½	20⅞	25¾	15⅝
5¼	2¾	3,300	4¾	4⅛	4⅜	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	3⅛	1	5¾	2

*Ex-dividend. †Plus extras. ‡Also 50 per cent in stock of Barnsdall Ref. §Partly on account of accumulation. ‖Dividend 4/75 Mission Corp. paid 3-15-35. ¶Includes extras.
**Plus 6% stock.

New York Curb Exchange

1936 High	1936 Low	Week ended Dec. 24 Sales	Week ended Dec. 24 High	Week ended Dec. 24 Low	Week ended Dec. 24 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1936	1935 High	1935 Low	1934 High	1934 Low
21	13¼	1,500	17⅜	16¾	17⅛	Bridgeport Machine Co.	260,000	N.P.	$1	12-21-36	$1.00	14⅛	3¾	3¾	½
50	39¾	150	47	46¾	47	Buckeye Pipe Line Co.	200,000	$50	$1Q	12-15-36	3.25	42½	30½	38	26
4⅞	1⅞	23,000	2½	1⅞	2½	Carib Syndicate	799,020	25c	....	.....	....	4¼	1⅝	5½	1½
124¾	105	300	110½	108½	108½	Chesebrough Mfg. Co.	120,000	$25	$2.50Q†	12-21-36	7.00	157	115	150	116
7⅜	4	35,300	4¼	3¾	4¼	Cities Service	37,804,394	N.P.	....	6-1-32	....	3¼	¾	4¼	1¼
4⅛	1½	26,200	3⅞	3	3⅞	Cosden Oil	399,687	$1	....	.....	....	1½	¼	3⅞	½
39	19⅞	15,700	39	33¾	38⅛	Creole Petroleum	6,974,356	$5	25cSA	12-15-36	.50	23¾	10	14⅜	9⅝
17¼	9	3,800	17	16⅛	16⅝	Darby Petroleum	351,390	$5	25cSA	7-15-36	.50	8⅞	4	7½	4⅛
6¾	1⅞	1,100	5⅝	5¼	5½	Derby Oil & Refining	263,162	N.P.	....	.....	....	2	¾	2¼	1
47	38½	No sales ..	..	..	..	Eureka Pipe Line	50,000	$50	$1Q	11-2-36	4.00	38	33¼	37	30
$58½	$54	24,400	58½	54	57¾	Gulf Oil Corp.	4,538,101	$25	75c†	12-10-36	1.50, 100% Stk.	74¾	50¼	76¾	49¾
80	57	8,100	80	72¾	79⅝	Humble Oil & Refining	8,923,935	N.P.	50c†	12-26-36	1.50	64	44	49½	33¼
24½	19¾	3,900	20¾	20¼	20½	Imperial Oil of Canada	26,919,871	N.P.	62½cSA†‡	12-1-36	1.25	22½	15¾	17⅜	12⅝
9¾	5½	700	8	7¾	7¾	Indiana Pipe Line	300,000	$10	20c Spl.	12-17-36	.80	6⅛	3⅝	6⅞	3⅝
39⅝	32⅝	6,800	34¼	33⅜	34¼	International Petroleum	14,247,088	N.P.	$1.25†‡	12-1-36	2.50	39¾	28	33⅜	19⅜
15⅜	9⅞	14,700	14	12¾	14	Louisiana Land & Exp.	3,000,000	N.P.	20cQ†	12-15-36	.50	11⅜	4⅜	5	2⅛
15½	7⅜	5,000	14⅜	13⅝	14⅜	Lion Oil Refining	270,000	N.P.	25cQ	12-26-36	.75	8⅛	3½	6	3⅜
14¼	9⅞	3,700	11½	11	11¼	Lone Star Gas	5,382,723	N.P.	20c	12-24-36	.60	10⅞	4½	8⅜	4¼
8⅜	5	4,800	6⅛	5⅝	6	Mountain Producers	1,682,182	$10	30cSA	12-21-36	.60	5¾	4⅛	5½	4
23	17½	3,400	18	17⅜	17⅜	National Fuel Gas	3,810,183	N.P.	25cQ	10-15-36	1.00	20	11¾	18⅛	13⅛
15¾	9¼	1,000	10½	10¼	10¼	National Transit	500,000	$12.50	35cSA	12-15-36	.75	10⅝	6¾	9½	7
4⅝	2⅞	600	5⅝	4½	4⅝	New Bradford Oil	1,445,202	$5	10cSA	5-15-36	.10	3¼	2	2½	1¾
6⅝	1⅝	4,500	5	3¾	5	New Mexico and Arizona	1,000,000	$1	1c	12-1-36	.01	2½	1	2¾	1
6¼	4¼	No sales ..	..	..	..	New York Transit	100,000	$5	15cSA	10-15-36	.35	4⅞	3	4¾	3
9¾	4⅞	300	8¾	8½	8¾	Northern Pipe Line	120,000	$10	35c	1-2-37	.40	8	5¼	7	4⅝
9¼	3¼	77,300	9⅜	8⅛	9⅛	Pantepec Oil	1,608,700	N.P.	....	.....	....	4⅜	1¼	2⅝	⅞
19¼	4½	4,900	14¾	13½	14¼	Root Petroleum Co.	336,045	$1	25c	11-2-36	.50	5	1½	..	..
4¾	1⅞	1,800	4⅜	4	4⅜	Ryan Consolidated	296,931	N.P.	....	.....	....	2½	⅝	3⅜	⅞
43¼	32½	1,100	42	40	42	South Penn Oil	1,200,000	$25	90c†	12-29-36	2.60	34½	21⅝	26½	17½
7⅞	3¼	No sales ..	..	..	..	Southern Pipe Line	100,000	$10	10cSA	9-1-36	.25	5	3⅞	5½	3½
60	44¾	No sales ..	..	..	..	South West Penna. Pipe Lines	35,000	$50	$1Q	10-1-36	13.00	56	44¼	47	41
23¾	17⅛	3,500	19¾	19¼	19¼	Standard Oil of Kentucky	2,604,790	$10	50cQ†	12-15-36	1.35	24	18	18⅜	14⅝
14⅝	11	100	11⅝	11⅝	11⅝	Standard Oil of Nebraska	188,403	$25	25c	12-19-36	.25	12	7¾	16⅞	8¼
40	21¾	2,000	37⅝	36½	37¾	Standard Oil of Ohio	753,740	$25	$1.50†	12-21-36	2.00	23⅝	11½	28½	12¼
5	2⅝	11,600	4¼	3⅝	4⅛	Sunray Oil	1,610,810	$1	5c	12-21-36	.10	2⅞	⅞	2	11/16
9¾	5⅜	2,400	6	5¾	6	Texon Oil & Land	336,028	$2	15cQ	12-28-36	.60	6⅞	5	11	4⅝

*Ex-dividend. †Includes extras. ‡Payable in Canadian funds. §New stock.

Note—In comparing highs and lows for the several years in the two tables, it will be necessary to take into consideration cases where there have been stock split-ups.

Oil Man's Calendar

January

11-15—Detroit, Mich., Society of Automotive Engineers, Book-Cadillac Hotel.

11-15—New Orleans, American Road Builders' Assn., highway exhibit and convention.

12—New York, Mining and Metallurgical Society of America.

16-24—Detroit, Mich., first International Consumers Petroleum Exposition.

18-19—Bismark, N. D., Northwest Petroleum Association, North Dakota Division, Patterson Hotel.

21-22—Minneapolis, Minn., Northwest Petroleum Association, Minnesota Division, West Hotel.

February, 1937

8-10—Louisville, Ky., Kentucky Petroleum Marketers Association, Brown Hotel.

23-25—Milwaukee, Annual Convention, Wisconsin Petroleum Association.

23-25—Columbus, Ohio, Ohio Petroleum Marketers Association, annual convention and Trade Exposition, Hotel Deshler-Wallick.

23-25—Milwaukee, Wis., Wisconsin Petroleum Association annual convention, Plankinton Hotel.

Memphis, Tenn., Southwest Sales Conference, Natural Gas Department.

March

1-5—Chicago, American Society for Testing Materials, regional meeting and committee week, Palmer House.

10-11—Indianapolis, Indiana Independent Petroleum Association Spring Convention and Refiners' and Suppliers' Exhibit, Hotel Severin.

15-19—Philadelphia, Pa., National Oil Burner & Air Conditioning exposition and convention, Convention Hall, Commercial Museum.

17-19—Los Angeles, Calif., A.A.P.G. annual meeting.

April

7-9—Birmingham, Ala., American Institute of Mining and Metallurgical Engineers, Open Hearth Conference.

8-10—Shreveport, La., Petroleum Industry Electrical Assn.

19-24—Houston, Tex., Oil Equipment & Engineering Exposition.

15-16—Cleveland, Ohio, 34th semiannual meeting National Petroleum Association, Cleveland Hotel.

May

10—Kansas City, Mo., Spring meeting Natural Gas Department, American Gas Association.

June

1-3—Colorado Springs, Colo., American Petroleum Institute, mid-year meeting, Broadmoor Hotel.

CLASSIFIED ADVERTISING

For Sale—Maps

OFFICIAL NOMENCLATURE MAP OF MID-CONTINENT AREA

SHOWS: Oil fields in green and gas fields in red, hand-colored. Index giving location of each field and official name as designated by the various state nomenclature committees. Cities, towns, county seats and principal streams.

AREA COVERED: East portion of Colorado and New Mexico, Southwest portion of Nebraska, States of Kansas, Oklahoma and Texas, Southwest portion of Arkansas, West portion of Louisiana.

SIZE: 66" x 90" SCALE: 1" = 12 miles.

This map on linen attached to heavy spring roller in dust proof steel case. Folder on Application.

E. C. JACOBSON

Phone 4-5419 530 McBirney Building

Tulsa, Oklahoma

STATE OF TEXAS
1937 REVISED EDITION MAP
New and Enlarged to include parts of New Mexico, Oklahoma, Arkansas and Louisiana. Shows oil and gas fields, etc. Price $1.00. Write for folder on county ownership and oilfield maps.
ZINGERY OIL MAP COMPANY
Fair Building Fort Worth, Tex.

OIL MAP of Texas. 50c. County maps $1-$1.50. Oil City Map Co., Fort Worth, Texas.

Business Opportunities

GEOLOGIST desires connection on percentage basis plus expenses. Highest credentials. Address Box G-823, The Oil and Gas Journal, 415 Lexington Avenue, New York City.

GEOLOGIST-Landman, familiar both East and West Kansas wants connection on salary and interest basis about February 1st. Address Box H-591, The Oil and Gas Journal, Tulsa, Oklahoma.

ORGANIZATION now being formed to engage in large mid-west oil operation with great profit possibilities. Ground floor opportunity to those who act now. Pre-organization certificates now being issued, in accordance with Securities Act only limited amount available. Only prompt action will avail you of this opportunity. Write at once.
BIG BASIN OIL COMPANY
940 Wabash Avenue
Terre Haute, Indiana.

Help Wanted

Salesman Pumping Equipment Item. Established line. Outlets established. Drawing account applies commission. Give age and experience. Address Box H-590, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Assistant Superintendent for complete refinery in southwest. Prefer young man, chemical engineer. State salary expected and give details of experience. Address Box H-580, The Oil and Gas Journal, Tulsa, Oklahoma.

Ranches and Farm Lands

HAVE four hundred acres four miles southeast of Idabel, on Frisco railroad, improvements fair, good farm or townsite proposition, sale price $1,600.00. Luther Calahan, Idabel, Oklahoma.

Royalties—Production

OKLAHOMA CITY AND FITTS
Royalties Quoted Dealers.
W. E. COOK
Perrine Bldg., Oklahoma City, Okla.

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

PRODUCING OIL ROYALTIES
for dealers
H. P. BOWEN
842 Kennedy Bldg., Tulsa, Okla.

F. A. SANSOME
Maintains a Complete Trading Organization for Brokers, Banks and Dealers
In
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522 Fifth Avenue, New York, N. Y.

PRODUCING OIL ROYALTIES
15 years of experience.
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Cheap cattle ranch. Big lake. 560 acres. $2,800 CASH. Best grass and water in East Colorado. J. Brown, Florence, Colorado.

Royalties—Production

Brokers—Salesmen

Sell in the most active area in the United States—The Permian Basin of West Texas and Southeastern New Mexico. From the standpoint of royalty investors this area has much to offer. Can supply you with choice non-producing royalties located on geophysical highs. Also drilling blocks, close in acreage to production, or wildcat leases. I maintain my own field men who cover this area for me. All offerings meet the requirements of the Securities and Exchange Commission. Inquiries invited.

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ROYALTIES PURCHASING TRUST, LTD., Moorgate Hall, Moorgate, London, E. C. 2., England, are buyers of producing oil royalties.

Mayflower Associates
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Missouri-Kansas Pipe Line Par $5
Larkins-Warr Trust
Oklahoma Carey Trust
Southwest Investment Trust
Washington Carey Trust
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Cosden Oil 6s 1938
Group No. 1 Oil
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BOUGHT — SOLD — QUOTED

We deal in royalties, working interests and all unlisted oil securities. Inquiries invited.

HENRY KEMP & CO.

Telephone WOrth 2-3310
Bell System Teletype N.Y. 1-1733
111 Broadway New York

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VAN POOL — EAST TEXAS
Bought — Sold — Wholesale.
W. R. Brown & Co., Inc.
14 Prospect Pl., East Orange, N. J.

NEW MEXICO Oil and Gas Leases and royalties. Send 50 cents in stamps for new State Oil Map of New Mexico. Roy G. Barton, Clovis, New Mexico.

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This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY

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Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	$1.05	$1.80	$2.55	$3.30	7 Lines	$2.45	$4.20	$5.95	$7.70
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We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

CLASSIFIED ADVERTISING

For Sale—Equipment For Sale—Equipment For Sale—Equipment For Sale—Equipment

GASOLINE PLANT EQUIPMENT

We are now dismantling two gasoline plants containing good used gasoline plant equipment:

Type 2500 complete Southwestern distillation unit
2—80 H.P. Collins portable water tube boilers
2—100 H.P. Reeves gas engines
2—225 H.P. Watts-Miller twin gas driven compressors
1—80 H.P. Bessemer gas driven compressor
2—80 H.P. Clark gas driven compressors
10—Sectional corrugated structural steel iron buildings from size 8′ x 8′ x 8′ to 30′ x 60′ x 22′.

Pumps, tanks, absorbers, Braun heat exchangers, Westcott meters, pipe, valves, fittings, etc. etc. etc.

Phone— Wire— Write—

BROWN-STRAUSS CORPORATION

Main Office—1446 Guinotte—Kansas City, Mo.

Branches:

Arkansas City, Kansas Sapulpa, Oklahoma Pyote, Texas

Steel Storage Tanks

50—Practically new 80,000-bbl. steel roof tanks, latest type.

125—55,000-bbl. storage tanks at great saving. Prices quoted on request for tanks standing, cut down, or reerected on your grade. Have all other sizes available. All tanks strictly guaranteed.

All kinds refinery equipment, valves, fittings, machinery, pumps and pump repair parts.

Wire—Phone—Write—W. C. Berry

SONKEN-GALAMBA CORPORATION

64 North Second St. Kansas City, Kansas.

WELDERS: All sizes and makes. A.C. and D.C. Transformer type, electric motor driven and engine driven. Reconditioned A-1. Service Co., 3732 Cedar Ave., Cleveland, Ohio.

FOR SALE

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25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air compressor, Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.

Terms to suit.

CINCINNATI MACHINERY & SUPPLY CO.

26 West 2nd St. Cincinnati, Ohio.

SEVERAL USED ROTARY RIGS
Spudders and Drilling Machines.
Several Steel Derricks & Rotary Equip.
J. S. Daniel, Beacon Bldg., Tulsa

40 H.P. Superior Oil Engine at Mexia: A-1 condition. Rebored cylinder, new piston and pin; has never been run; price $750. C. K. Walsh, Atty., Hamilton Bldg., Wichita Falls, Texas.

Gas and Oil storage tanks any size, riveted or welded. Built to order. Write or wire for quotations.
PIPE & MINING SUPPLY COMPANY
Box 1431, Ph. Tabor 5357, Denver, Colo.

Equipment Wanted

WANTED — Steel Building—from 50′ to 75′ wide, 100′ to 125′ long, 18′ to 20′ walls. To support 5 Ton crane. Western Iron and Foundry Company, Wichita, Kansas.

66,000 feet of 8⅝" O. D. plain end seamless or lapweld line pipe. Must be in good condition and weigh not less than 19.48 lb. per foot. Price F. O. B. shipping point. Address P.O. Box 142, Ashland, Ky.

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DELAWARE CHARTERS: Complete incorporating and organizing service $35. Submitted forms, Chas. G. Guyer, Inc., Wilmington, Delaware.

CHARTERS — Delaware best, quickest, cheapest, most liberal. Free forms. Colonial Charter Co., Wilmington, Del.

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Of royalty investors from pipe line company records; retail royalty brokers. By states. Write for folder.

Special: 100 large oil company lease buyers in Mid-Continent. Price $5.00.
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Corporations also Departmental in Washington.

Leases—Production

NEW MEXICO—My weekly scout report furnishes complete and reliable information on New Mexico developments. Send for copy. W. S. Patterson, Santa Fe, New Mexico.

NEW MEXICO, Chaves County, 8500 acre solid lease block, 9 years to run, 5c rentals, price 25c per acre. Roy G. Barton, Box 191, Clovis, New Mexico.

1,000 ACRES in Woodson County, Kansas, want to sell ½ interest with a well drilled 1,700 feet or to 1st break in Mississippi lime. Philip Birk, Gridley, Kansas.

FOR SALE—Producing well on 160 acres, Russell County, Kansas. First break in Oswald Lime, 39 gravity oil. 900 barrels December allowable. Good reason for selling. Address Box H-575, The Oil and Gas Journal, Tulsa, Oklahoma.

Leases—Production

ROYALTY, leases, 4,000 acres Brooks County, Texas, west of Alta Verde field, active territory. D. N. Clark, Albia, Iowa.

DRILLING BLOCKS, Leases, Western, Central Kansas, Sumner to Smith counties may be arranged for—worthy of consideration from reliable operators. State required specifications. Address Box H-570, The Oil and Gas Journal, Tulsa, Oklahoma.

BUY—SELL
Proven Leases in Louisiana-Arkansas
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323 Commercial National Bank Bldg., Shreveport, La.

CORE DRILLING
Any nature — Anywhere
Latest equipment
Will take interest deal with reliable Independent Operator.
PAUL R. KING
Box 341, Hutchinson, Kans.

For Sale—80 acres oil and gas lease, Andrews Co., Tex., near New Mex. state line. Address Landowner, 150 Lake St., Bellevue, Kentucky.

GET in West Virginia's new deep sand lease play, buy acreage near new test wells of major companies, $1 to $10 per acre. Ohio and Illinois leases for sale. Royalties and production bought and sold. H. P. McGinnis, Box 827, Parkersburg, West Virginia.

LANDS Leases, Royalties, anywhere, bought, sold. Lands, $2 acre, up. Leases 25c acre, up. Advise needs. American Investment Co., Houston, Texas.

Drilling in South West Rush County, Kansas. Good core drilled structure gas seepage. Leases—Royalties for sale reasonable. M. A. Delaney, Nekoma, Kans.

PROVEN, non prorated lease, heart Kans. major field. sell ½ interest to drill. Exceptional area. Address Box H-583, The Oil and Gas Journal, Tulsa, Okla.

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